

PROCEEDINGS
OF THE
GENERAL MEETINGS FOR SCIENTIFIC BUSINESS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.
(May to December, 1909.)

May 11, 1909.

Prof. E. A. MINCHIN, M.A., Vice-President,
in the Chair.

Mr. R. H. Burne, M.A., F.Z.S., exhibited a series of specimens, from the Museum of the Royal College of Surgeons, of adaptive structures for the respiration of air in some Aquatic Invertebrates and tropical Freshwater Fishes.

Mr. R. I. Pocock, F.L.S., F.Z.S., the Superintendent of the Gardens, exhibited the skin of a Monkey, representing a well-marked undescribed local race of *Cercopithecus tantalus*, which he proposed to name *Cercopithecus tantalus alexandri* in honour of Capt. Boyd Alexander, F.Z.S., who had brought the specimen from Lake Chad and presented it to the Society. He said:—
“The colour of the upper side of this specimen is speckled greyish green, the coloured annuli in the hairs being less green than is usually the case in Nigerian examples of *C. tantalus*, but as in the latter it becomes richer on the crown of the head; the face is wholly black and the white brow-band is well marked. The whiskers, however, are very long, as in *C. aethiops* of Abyssinia and the Upper Nile; but instead of being wholly white, as in

that species, the hairs are slightly stained with yellow and very indistinctly speckled apically. Owing to the whiteness of the whiskers the brow-band is not so sharply defined at its extremities as in typical *C. tantalus*, where the whiskers are not only much shorter but are markedly stained with yellow almost throughout their length. The hairs of the sides of the neck are also long and mostly white, but towards the apex yellowish and speckled with black. On the arm and leg the greenish tint dies out of the hairs well above the elbow and knee, and it only extends for a short distance upon the root of the tail; the rest of the arms and legs, the hands and feet, and the upper side of the tail being grey. As in typical *C. tantalus*, the inner sides of the limbs, the under side of the body and of the tail are white, with a patch of rusty hairs upon the pubic region; and, as in *C. tantalus tantalus* and *C. aethiops*, there is a conspicuous tuft of whitish hair on each side at the base of the tail above the ischial callosity.

“Although the length and whiteness of the whiskers give this monkey a striking superficial resemblance to *C. aethiops*, it appears, as might be expected from its locality, to be most nearly allied to *C. tantalus*, being at once distinguishable from *C. aethiops* by the absence of white hairs from the lips and chin. Nevertheless, it is in a measure intermediate between the two species, and to a great extent justifies my surmise (P. Z. S. 1907, p. 733) that the two will be found to intergrade.

“*C. tantalus* is now known to be represented by three races; namely, the typical *C. tantalus tantalus* from Nigeria, *C. tantalus alexandri* from Lake Chad, and *C. tantalus budgetti** from Bathyaba on the eastern shore of Lake Albert in Uganda. The last-mentioned differs from the others in having the whiskers much more decidedly speckled, and in the large size of the red patch and the more fiery colour of its hairs on the pubic area.”

Mr. W. F. H. Rosenberg, F.Z.S., exhibited a Rook in which the upper mandible had overgrown the lower to a remarkable extent. This abnormality had evidently been caused by an injury to the tip of the lower mandible having deprived the upper one of the opposing surface necessary to check its growth.

The bird was shot by Mr. Percy I. Lathy, F.Z.S., F.E.S., on February 7th, 1909, at Nazeing, Essex. Mr. Lathy shot it out of a flock, and did not notice anything peculiar till he picked the bird up. The bird was in good condition, so that it could not have had the difficulty in feeding which one might have expected from the excessive prolongation of the upper mandible.

Length of upper mandible 70 mm.; length of lower mandible 51 mm. Normal length of upper mandible 55 mm.

* Pocock, P. Z. S. 1907, p. 733.

The following papers were read:—

1. Contributions to the Study of the Equidæ; i. The Differentiation of the Three Species of Zebras. By Prof. WILLIAM RIDGEWAY, M.A., Sc.D., F.B.A., LL.D., Litt.D.*

[Received April 21, 1909.]

(Text-figures 140-155.)

I propose to describe ten skins of Zebras from British East Africa, the interest of which consists partly in the fact that they were all shot expressly for me, and that an exact record of the locality and the altitude was kept in each case. They have thus a far higher scientific value than the ordinary specimens in our museums, which have for the most part been obtained from sportsmen or traders, who could give no accurate information regarding the provenance of the specimens. I must express my gratitude to the Rt. Hon. Alfred Lyttelton, K.C., M.P., who when Secretary of State for the Colonies authorised the officials of British East Africa to assist me in obtaining zebra skins, and to my friend, Mr. C. W. Hobley, C.M.G., Assistant-Commissioner at Nairobi, who kindly undertook to see that the instructions of the Secretary of State were carried out, and on whom devolved all the trouble of packing and despatching the specimens.

But the skins have a further value, since they demonstrate that the individuals of the same species vary in coloration from locality to locality, and that it is useless attempting to make species or subspecies out of animals which are mere local varieties. Finally, we may reason from what these skins demonstrate as taking place in a given area that the same differentiation has taken place in the coloration of all the Equidæ from Northern Europe and Asia down to Cape Colony, a lesson which applies equally to the whole animal kingdom, man included.

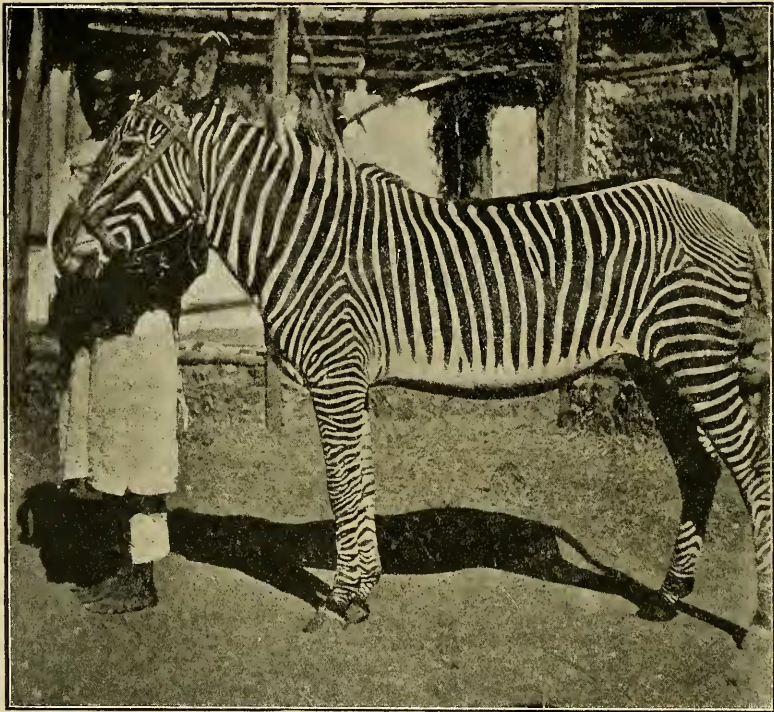
Zoologists are generally agreed that all existing Zebras fall into three main species:—*Equus zebra*, or the Mountain Zebra, formerly very abundant in Cape Colony, *E. burchelli*, and *E. grevyi*, though Dr. Matschie treats as true species certain varieties of the Burchell family. Mr. Pocock has shown that all the varieties of the Burchell Zebra seem to shade off into the better marked specimens of the now extinct Quagga of Cape Colony, whilst Prof. Ewart has shown that a bridge can be found between the Mountain Zebra and the Burchell family, through Crawshaw's variety of the latter.

The chief characteristics of the three species may be briefly enumerated.

The splendid Grévy Zebra, found in Somaliland, Shoa, and

* Communicated by Dr. P. CHALMERS MITCHELL, M.A., F.R.S., F.Z.S.

Text-fig. 140.

Grévy Zebra (*E. grévyi*).

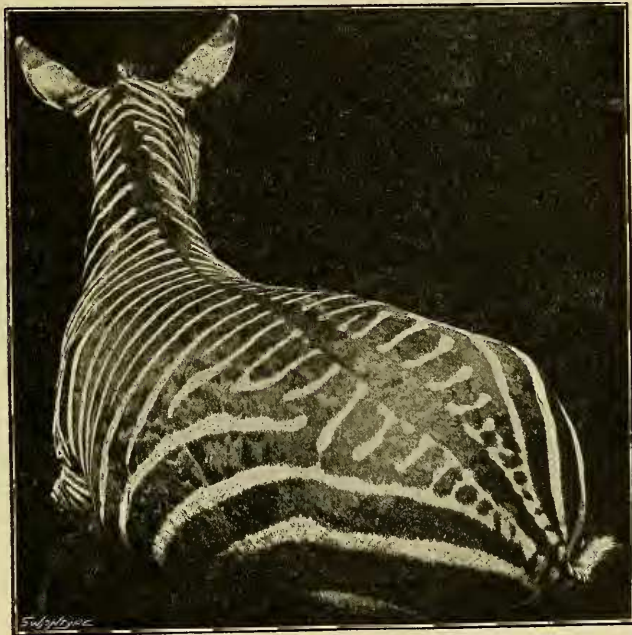
Text-fig. 141.

The Mountain Zebra (*E. zebra*).

British East Africa as far south as the River Tana, is covered with narrow stripes (text-fig. 140), and its ears are more ass-like than those of the other two species, though its feet are more like those of the horse. In many specimens there are small stripes coming out from the dorsal stripe over the croup, but there are distinct variations in coloration between the Somali, Shoa, and British East Africa specimens.

The Mountain Zebra (text-fig. 141) is also striped all over its body and legs, but the stripes on the haunches differ completely from those of the Grévy species, whilst a chief characteristic is the small stripes on its croup termed its "gridiron."

Text-fig. 142.



Ward's Zebra (Baringo).

In a skin procured from Mr. Rowland Ward, Prof. Ewart found an animal almost the same as the South African Mountain Zebra, which he named Ward's Zebra. There is some doubt as regards the provenance of this skin. It first appeared to have come from Somaliland, but I embodied in my 'Origin and Influence of the Thoroughbred Horse' (p. 508) a note from Prof. Ewart stating that it came from the Lombori Hills, which form the southern edge of the Naivasha Plateau near the Uganda Railway in British East Africa. Of its provenance I will say more later on.

My illustration (text-fig. 142, p. 549), by the kind permission of Messrs. Rowland Ward & Co. and of Mr. R. Lydekker, F.R.S., is from the latter's 'The Game Animals of Africa,' fig. 23, p. 65.

In the Burchelline group the enlargement of the stripes seen on the haunches of the Mountain Zebra is found all over the body. The stripes are far larger and fewer in number, whilst in many varieties shadow stripes are seen, the vestiges of the closer striping still surviving in the Grévy and Mountain species.

Text-fig. 143.

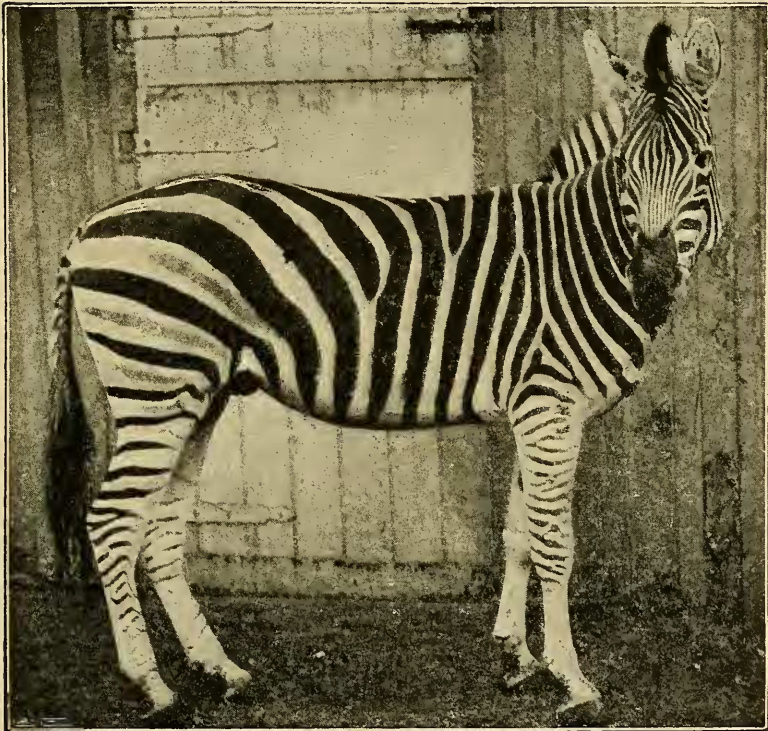


E. burchelli (var. *granti*).

The most northerly variety of this species is Grant's Zebra (text-fig. 143) found all over East Equatorial Africa. As we advance southwards we find it shading off into Chapman's variety found in the Transvaal, in which the legs are no longer striped down to the hoof (text-fig. 144), whilst in the typical Burchell Zebra or Bonte Quagga of the Orange River Colony the legs and the under surface of the body are free from stripes (text-fig. 145, p. 552).

The Crawshay variety of the Burchell Zebra found in Nyassaland, so far as colour is concerned, as Prof. Ewart has pointed out, is the bridge between the Burchell and Mountain Zebras, as it has black stripes close together, and small stripes on the croup, resembling the "gridiron" of the Mountain Zebra and recalling the small stripes in some Grévy Zebras.

Text-fig. 144.



E. burchelli (Chapman's variety).

It is now universally held that in the Grévy Zebra we have the oldest type of coloration of the Zebra family, though I have argued elsewhere against the doctrine formerly held that in its skin we have the primæval livery of the ancestor of all the Equidæ. In coloration at least the other two species are more recent than the Grévy.

I here figure ten skins, two of Grévy's Zebra, and eight of Grant's variety of *E. burchelli*. Text-figs. 146 & 147 show the

skins of a male and a female Grévy Zebra shot by the late Mr. A. H. Neumann at Euaso Nyiro at an altitude of 3000 ft. Both specimens lack the small stripes commonly found in specimens from Somaliland and Shoa, and which correspond to the "gridiron" of the Mountain Zebra. Text-figs. 148 & 149 show the skins of a male and a female of Grant's variety from Baringo (3000 ft.). The former shows faint, the latter more marked vestiges of the croup or "gridiron" stripes, thus showing a slight approximation in colouring to the Grévy and Mountain Zebras.

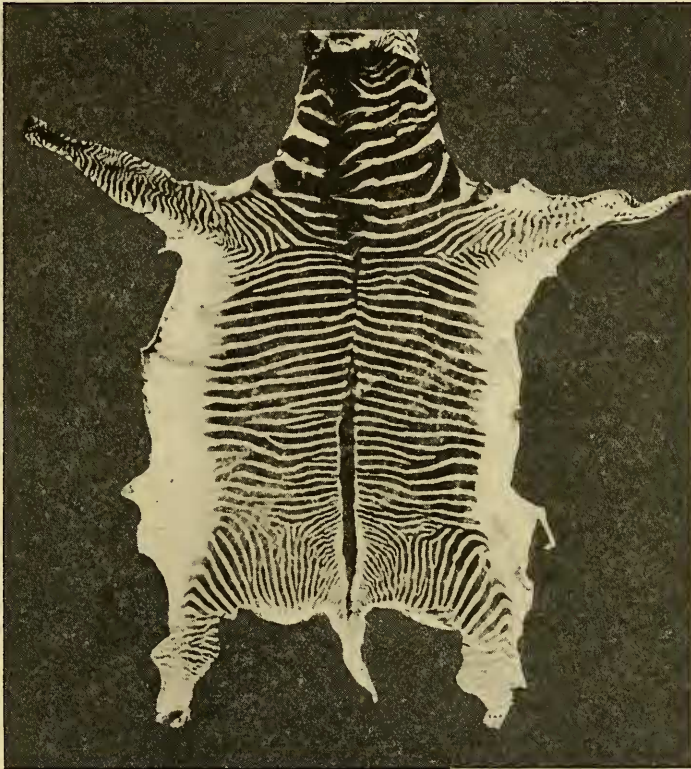
Text-fig. 145.

*E. burchelli* (Bristol).

Text-figs. 150 & 151 exhibit two skins (male) from Laikipia (5800 ft.). Text-figs. 152 & 153 give the skins of a male and a female from Uasingishu (6500 ft.). Next comes that of a male from Kinolop (7500 ft.), whilst text-fig. 155 is that of a male from the north end of the Aberdare Range (8000 ft.). The last has longer hair than the rest. The variation in the skins from different localities and altitudes is obvious. This is in accord with the testimony of that excellent observer, Mr. A. H. Neumann, who ('Elephant-hunting in East Equatorial Africa,' p. 372)

notes in reference to a zebra shot in one locality that "along its back were spots or blotches instead of distinct stripes," and he remarks that there are many local varieties of the same species. He told me also that in the area just referred to, all the Grant's Zebras he met had this blotching on the back. In this respect they seem to resemble my two skins from Baringo.

Text-fig. 146.

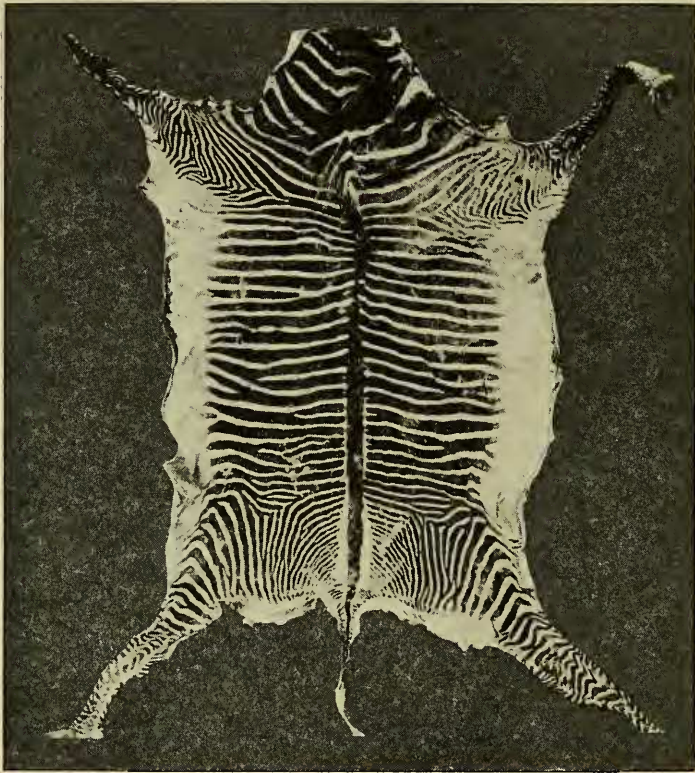


Grévy Zebra (male); Euaso Nyiro (3000 ft.).

Can we discover the region where the differentiation of all three species gradually took place? It ought to be where all three species once overlapped or still overlap. This would rule out South Africa, for no animal of the Grévy type has ever been found in those latitudes. But in the northern part of British East Africa in the region round Lake Rudolph and Lake Baringo the Grévy and Burchelline Zebras are found overlapping as far south as the Tana

River, below which the Grévy species, as is stated by Mr. A. H. Neumann, does not occur. On the other hand the Burchell type is never found in Somaliland or Shoa, where the Grévy species seems to be the sole zebra, and where its nearest neighbours are the Somali and the Abyssinian Asses. It thus extends further up than the other zebras in North-east Africa. But in the region round

Text-fig. 147.



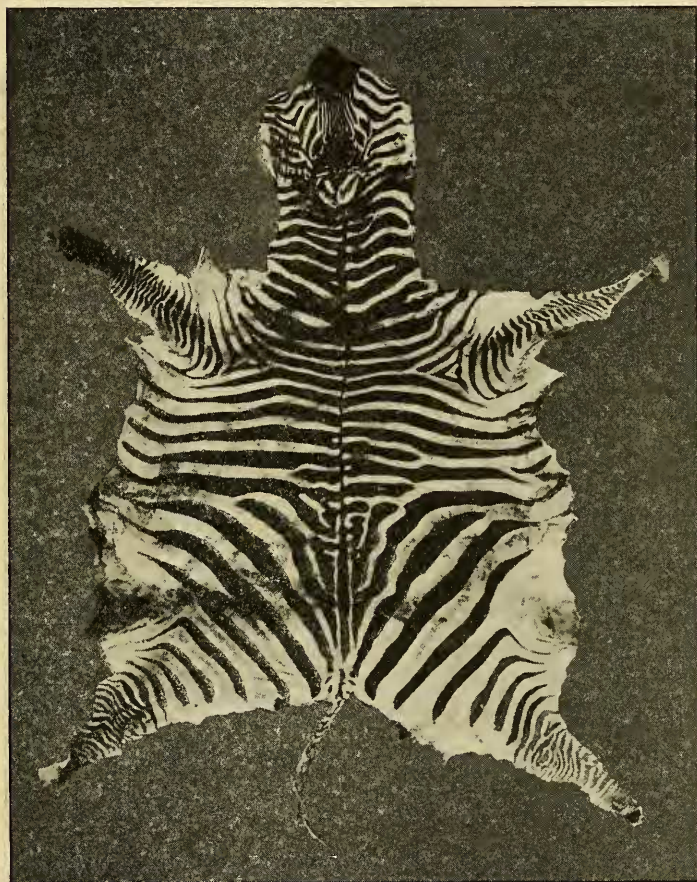
Grévy Zebra (female) ; Euaso Nyiro (3000 ft.).

Lake Baringo where the Grévy Zebra overlaps the Burchelline, at least one specimen of the latter is known to possess a functional premolar, a feature common in Grévy Zebras, and a peculiarity which is a survival from Pliocene forms such as *E. sivalensis* of India and *E. stenonis* of North Africa and Southern Europe.

Two of my skins (text-figs. 148 & 149), both from animals shot at Lake Baringo, have small stripes or spots indicating vestiges

of such small stripes as those found on the croup of Crawshay's Zebra from Nyassaland, and which resemble the small stripes on the croup of many Grévy Zebras and the "gridiron" of the Mountain Zebra.

Text-fig. 148.

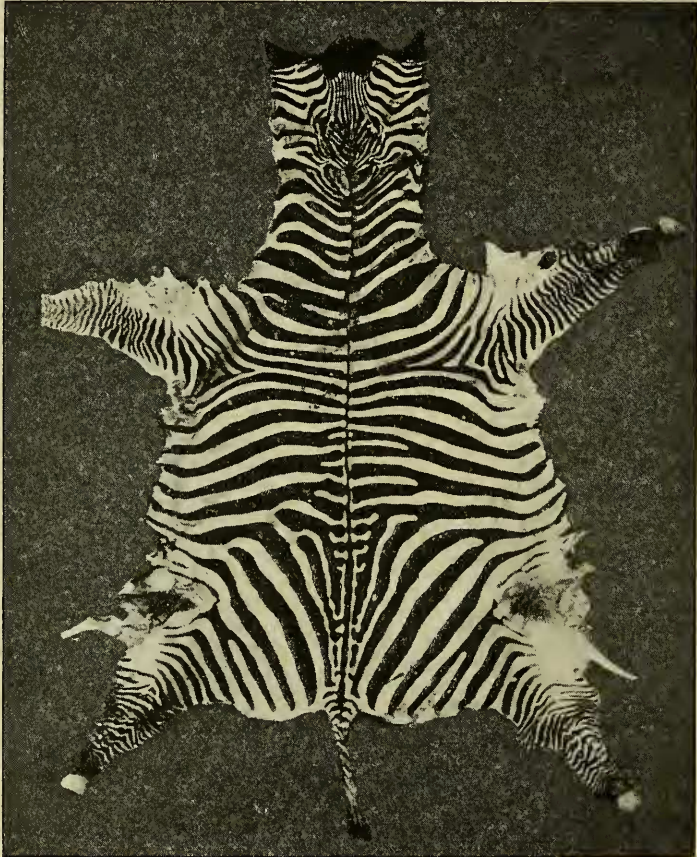


Grant's Zebra (male); Baringo (3000 ft.).

Thus at Lake Baringo we have a point of contact between the Grévy and the Burchelline Zebras, not only in coloration but in osteology. Now if we could find a zebra of the Mountain type in that same area we might not unreasonably infer that in this region we have the point from which the various species of zebras had radiated.

I have not been as yet able to get a specimen of Ward's Zebra from this area. But, on the other hand, Mr. C. W. Hobley not long since wrote to me the substance of a conversation which he had with Lord Delamere, the well-known big-game shooter. The latter told Mr. Hobley that he had sent home to Mr. Rowland

Text-fig. 149.

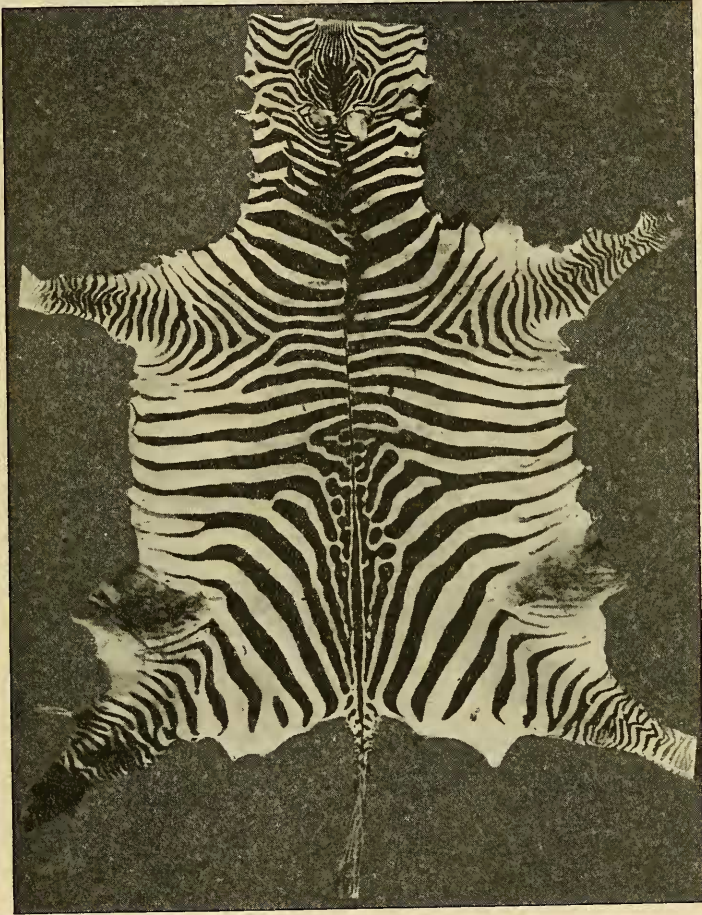


Grant's Zebra (female); Baringo (3000 ft.).

Ward the skin of a zebra, which some one had named after Mr. Ward. This animal Lord Delamere said he had shot at Baringo. We have thus at last got the true provenance of this very important specimen from the mouth of the sportsman who shot it.

But as Ward's Zebra is virtually the Mountain Zebra only locally varied, I submit that it was in the northern part of British East Africa that the differentiation of the three species, not only in colour, but also in osteology, had begun.

Text-fig. 150.

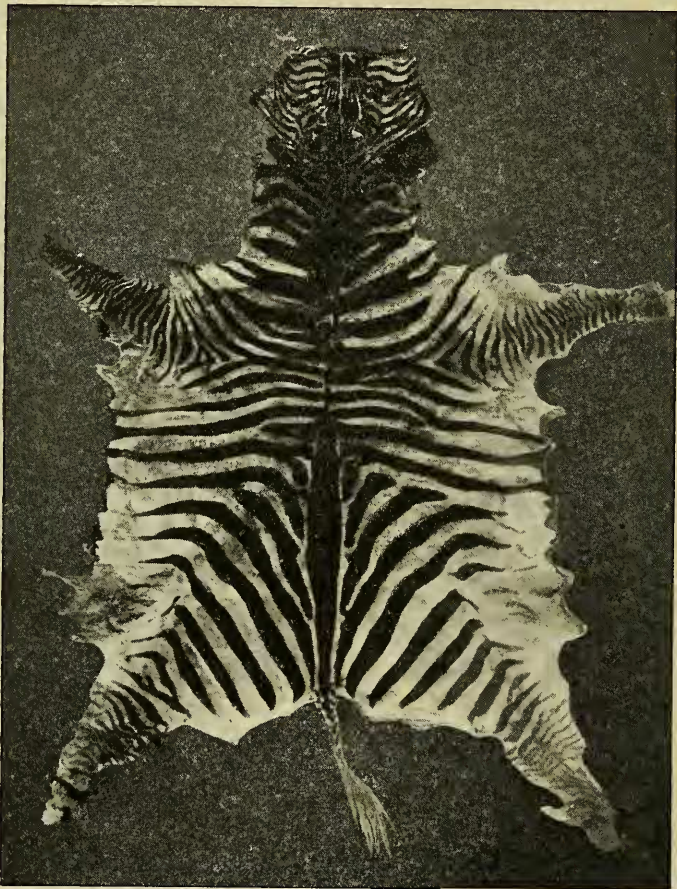


Grant's Zebra (male); Laikipia (5800 ft.).

In this area there are lofty mountains, elevated plateaus and low-lying swamps, as well as hill country with abundance of grassy patches in it. Is it to these different types of country that the differentiation in types may be due?

I had remarked in reading Mr. A. H. Neumann's excellent book, 'Elephant-hunting in Equatorial East Africa,' that although both Grévy and Burchelline Zebras are found in the same country and not unfrequently together, yet on the whole

Text-fig. 151.

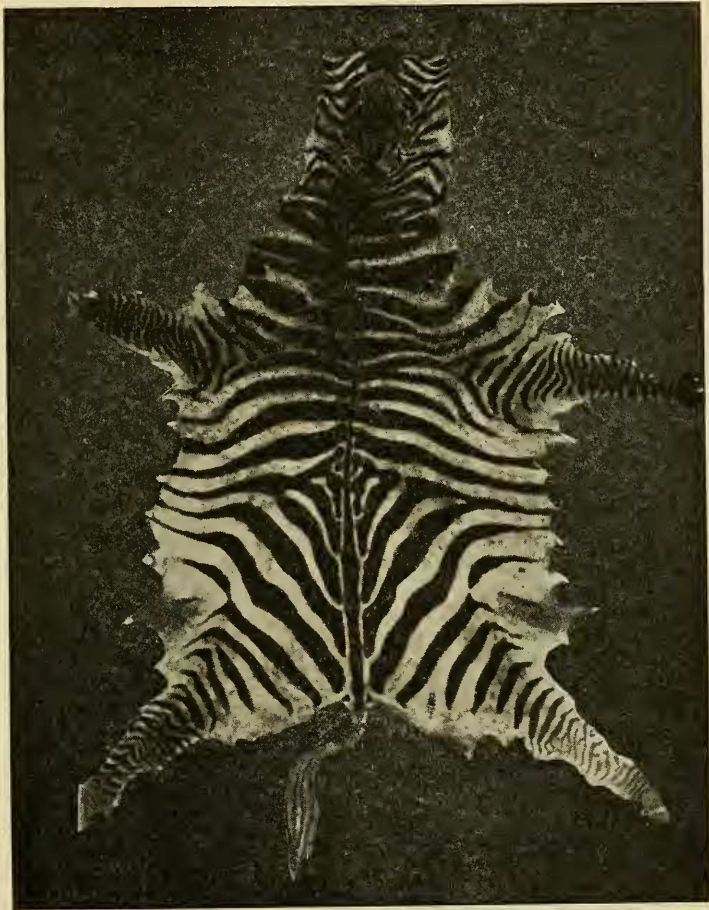


Grant's Zebra (male); Laikipia (5800 ft.).

Grévy Zebras live in low-lying grounds with a thin vegetation of prickly shrubs, whilst the Burchelline species lives commonly at a higher elevation and where there is more bush and richer pasture. But on the mountains and plateaus of this area the conditions

are much the same as in the mountainous regions of South Africa, where the Mountain Zebra was formerly abundant.

Text-fig. 152.

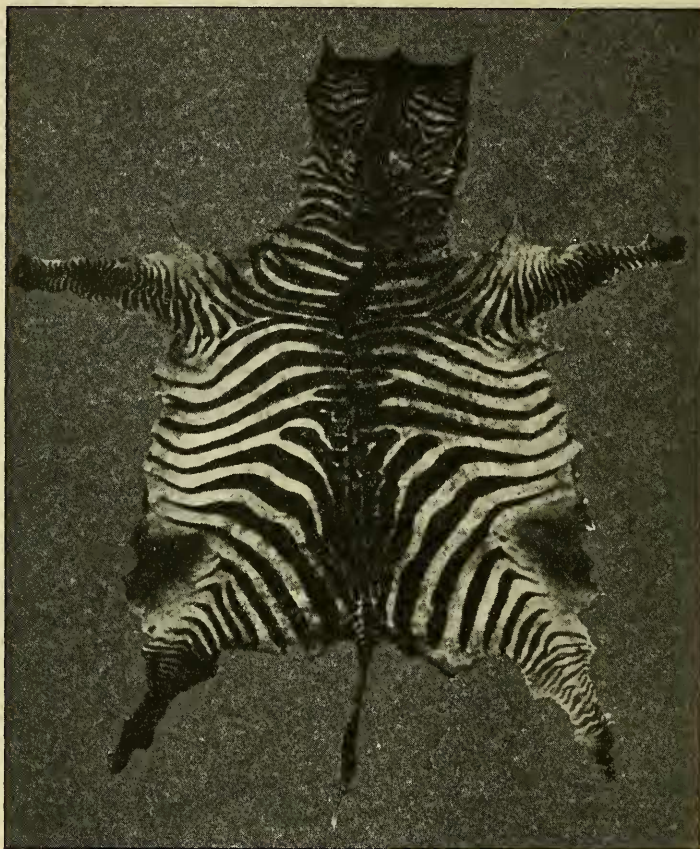


Grant's Zebra (male) ; Uasingishu (6500 ft.).

I had an opportunity of talking over this view with Mr. Neumann, who approved of it, and in confirmation told me that he had visited the great swamp at the upper end of the Euaso Nyiro River, and in the low-lying lands there, although it was within the geographical area occupied by the Burchelline Zebras (Grant's variety), he never found any of that species,

though the Grévy Zebras were abundant. I had previously noted in Col. Swayne's valuable paper (P. Z. S. 1894) that in Somaliland the Grévy Zebra lives in a like environment. He found them first at Durhi, about 300 miles inland from Berbera. These zebras are very common in the land of the Rer Amaden and

Text-fig. 153.

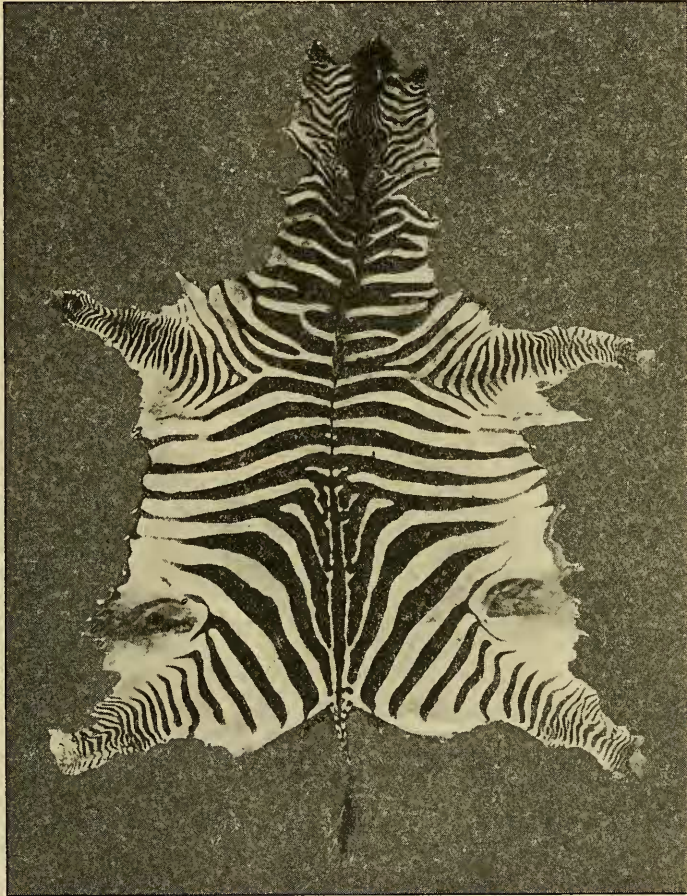


Grant's Zebra (female); Uasingishu (6500 ft.).

Malingur tribes. "The country there is covered with scattered bush over its entire surface, and is stony and much broken up by ravines; the general elevation is about 2500 feet." The zebras "were met on low plateaux covered with scattered thorn bush and glades of *durr* grass, the soil being powdery and red in colour with

an occasional outcrop of rocks. I saw none in the open flats of the Webbe Valley, and they never come near so far north as the open grass plains of the Haud, Durhi south of the Fafan being their northern limit."

Text-fig. 154.



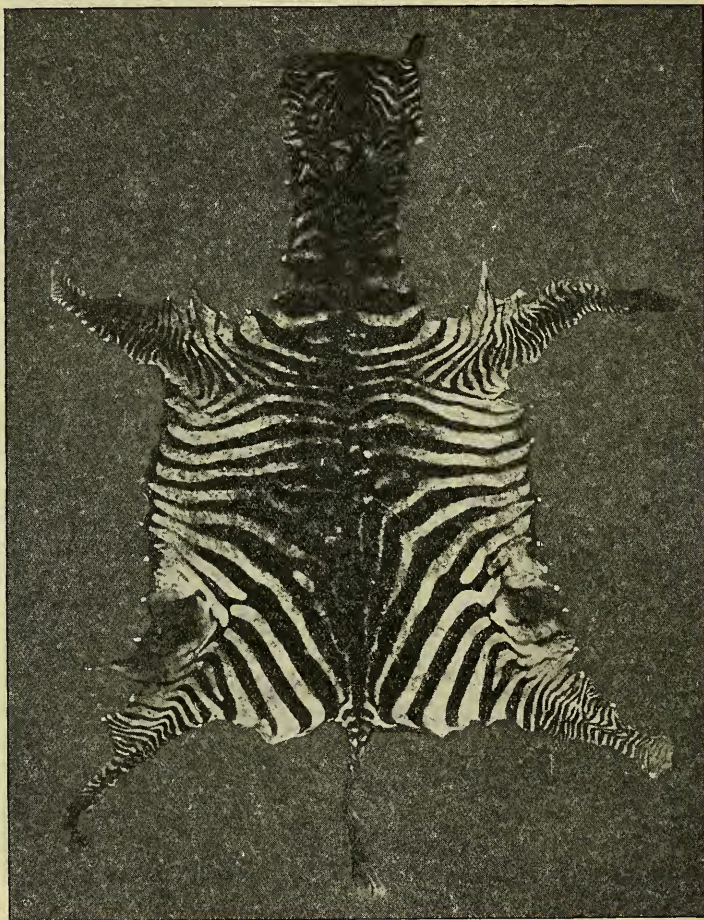
Grant's Zebra (male); Kinolop (7500 ft.).

On the high plateaus it is quite possible that Ward's Zebra, or in other words the Mountain Zebra, was differentiated. Mr. Neumann told me that he knew three or four localities where it might be quite possible to find the Mountain Zebra, and it was his intention, when he went out again, to make a diligent search for such.

That animals living at a high elevation have to adapt themselves

to it, is shown by a skin (text-fig. 155) of a Grant's Zebra shot on the Aberdare Range about 8000 feet high. The hair of this skin is much longer than that of my other skins from East Africa. Mr. Neumann had hunted over that range, and seen a

Text-fig. 155.



Grant's Zebra (male); north end of Aberdare Range (8000 ft.).

few Grant's Zebras there; they did not live on the top, but only passed up and down over the edge of the plateau.

I may point out that just as the Burchelline Zebras from the most northern point where they are met keep changing from locality to locality (as is demonstrated by my skins from East

Africa) until they passed into the Quaggas of Cape Colony, so on the north the Grévy with its ass-like ears comes closer in that respect to its neighbours, the asses of Somaliland and Abyssinia, whilst its hoof resembles that of the horse more than those of the other zebras. The difference between its hoof and those of the two other species may be due to the fact that it is not a mountain animal, but always keeps rather to the low and often swampy ground.

2. Contributions to the Study of the Equidæ; ii. On Hitherto Unrecorded Specimens of *Equus quagga*. By Prof. WILLIAM RIDGEWAY, M.A., Sc.D., F.B.A., LL.D., Litt.D.*

[Received April 21, 1909.]

(Text-figures 156-180.)

In view of the scantiness of our existing material for arriving at any conclusions respecting the now extinct *E. quagga*, which once roamed the plains of Cape Colony in vast herds, and was found in Orange River and Griqualand West, it is most important to make known any yet surviving specimens which have hitherto escaped the vigilance of zoologists. In my 'Origin and Influence of the Thoroughbred Horse' (pp. 438-9, figs. 131-3) I was enabled to publish the head and neck of a Quagga, preserved in the Elgin Museum (to which my attention had been called by my friend Dr. Duckworth) (text-fig. 172, p. 581). This specimen shows a white ground-colour in the middle of the forehead like the typical specimen described by Edwards in 1758 (text-fig. 173, p. 582).

I.—By the kindness of another friend, Mr. R. C. Punnett, F.Z.S., Fellow of Gonville and Caius College, I am now able to describe and figure for the first time an entire specimen hitherto neglected by zoologists. This specimen is preserved in the Naturgeschichtes Museum at Basel, and for the photograph from which the illustration (text-fig. 157, p. 565) is taken as well as for the description I am indebted to the great kindness of Dr. Fritz Sarasin, the Director of that Museum. The specimen (a female) was presented to the Basel Museum in 1864 by a missionary called Gysin, who resided at Silo (Shiloh), Cape Colony. The fact that in this case, as well as in that of the Elgin specimen, we have some indication of the locality where the animal was killed is of considerable importance, inasmuch as few of the other specimens as yet known have any provenance.

Dr. Sarasin writes as follows:—"The ground-colour of the centre of the forehead is not white and not lighter than the ground-colour of other parts of the face and neck. The colour of the stripes on head, neck, and back is bright chestnut ('hell kastanienbraun,' 'brun marron clair'). The colour of the non-

* Communicated by Dr. P. CHALMERS MITCHELL, M.A., F.R.S., F.Z.S.

striped hinder parts is bright brown ('hellbraun,' 'brun clair'). There is a broad dorsal stripe of a deep maroon ('dunkel kastanienbraun') colour, bordered on each side by a small stripe of yellowish white ('gelblichweiss,' 'blanche-jaunâtre') colour. The hair of the tail is bright cream ('hell crème'). The underparts of the body are of a 'crème-blanchâtre' colour, so also are the legs, but getting darker towards the feet."

This new specimen has a peculiar interest, for it differs from all the others known, and may serve to bridge over the gulf between the Quaggas of Cape Colony and the Burchell Zebras.

Text-fig. 156.

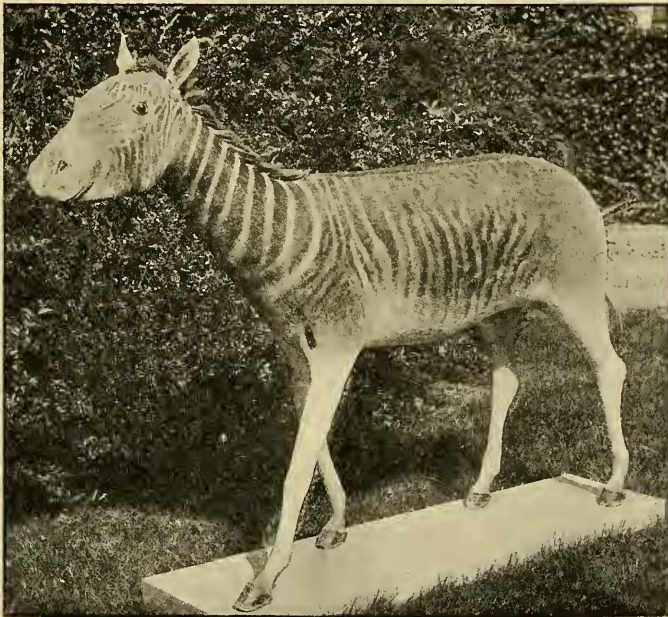


E. burchelli (Paris); north of Cape Colony (about 1820).

Mr. Pocock has well pointed out that the current descriptions of the Quagga are made up by blending together animals of different types, whilst he and Mr. Lydekker have suggested that the Quaggas figured by Edwards (text-fig. 173, p. 582), by Harris (text-fig. 180, p. 586), and Hamilton Smith (text-fig. 178), may be subspecifically distinct from the one photographed by York (text-fig. 164, p. 575), the last known living example of its race, which survived in the Zoological Gardens until 1872. Mr. Lydekker ('Science Progress,' 1902, pp. 220-2) proposed names for two new subspecies. (1) *E. quagga greyi*, under which fall the British

Museum (text-fig. 163), Amsterdam (text-fig. 170), Edinburgh (text-fig. 165), and Tring (text-fig. 159) specimens; the last being (he thought) that really photographed by York. (2) He applies the name *E. quagga lorentzi* to the famous Vienna specimen (text-fig. 158). But Mr. Lydekker is now very doubtful whether the division into races is justifiable, although it is possible that the Vienna specimen may be distinct, and "despite certain differences in regard to the width and backward extension of the stripes, and also the relative proportions of the white and fawn areas," he is

Text-fig. 157.



The Basel Quagga (female); Silo, Cape Colony, 1864.

"disposed to regard the quaggas figured by Edwards, Harris, and Hamilton Smith, as representing the same type of animal."

Mr. Pocock has added a third subspecies: *E. quagga danielli* (text-fig. 179, p. 585).

Mr. Pocock has argued that the Burchell Zebras and the Quaggas of Cape Colony are only subspecifically distinct, and he includes all the varieties of the Burchell Zebra as well as the true Quaggas of Cape Colony under the species *E. quagga*.

Whether these two types of animals were specifically or subspecifically distinct, the relationship between them was extremely close. Furthermore, it is generally admitted that the Vienna Quagga, of all the specimens hitherto published, comes nearest to the true Burchell Zebra.

But a glance at the illustration of the Basel Quagga will show that it comes still closer to the Burchell Zebra than the Vienna specimen, and it may be taken as virtually filling the gap which hitherto has existed between the true Burchell Zebra and the Quagga of Cape Colony.

It would seem that we must be careful not to make species or subspecies too hastily, for it may turn out that slight local differences in the environment may cause a difference in the coloration of animals which are practically one and the same in type. This, indeed, can be put beyond all doubt by the series of skins in my own possession, which I obtained from British East Africa (*supra*, pp. 547-563).

II.—I will next describe another specimen of *E. quagga*. It has long been known by hearsay to those interested in the subject, but, so far as I am aware, it has not been described or figured by any of our leading authorities on the *Equidae*. Sad to say, it is the only specimen of the true Quagga preserved in the Museums of South Africa. For, although the Director of the Bloemfontein Museum, in reply to my inquiries, informed me that there was in the Museum a skin of the true Quagga, when the photograph, taken for me by a local photographer, arrived, the skin turned out to be probably that of the true Burchell Zebra. But as the legs had been trimmed off, it is by no means certain that it is even that of a true Burchell.

However, in the Cape Town Museum, there is a genuine relic of the true Quagga, which, by the kindness of Dr. L. Péringuey, the Director, I am able to describe in his words and to figure from a photograph kindly sent to me by him. Dr. Péringuey writes:—

“I very much regret to say that the extinct Quagga is represented in the collection by a foal only. The skin was never properly mounted, and the animal looks somewhat grotesque, but I dare not have this relic taxidermised. The animal was procured from the Beaufort West district of the Cape Colony *circa* 1860. It is rufous-brown, the stripes whitish, but slightly mingled with rufous, or rather tawny, on the edges. The animal is 110 cm. from nose to the root of the tail, 68 cm. at the shoulders, 70 cm. at the hind quarters; the length of the head is 30 cm. from the muzzle to the centre of the ears. The remarkable feature of the foal is the great length of the hairs; those bearding the lower jaw are 3 cm. long. On the facial part there are four distinct stripes and many outer, ill-defined ones. These show distinctly in the photograph.” (Text-fig. 171, p. 580.)

I here figure all the chief specimens of the Quagga which I have been able to find in the museums of Europe and Africa, except that at Turin* and those said to be at Mainz and Frankfurt-on-

* I obtained, but too late to reproduce, a picture of this specimen, by the kindness of Dr. L. Camerano, who published it (*Atti d. R. Accad. d. Scienze, Torino*, vol. xliii. pp. 3-6, pl.).

Main *. I have arranged all the specimens in a series according to the amount of striping in each specimen. This will serve to show the relation of the Basel Quagga to those already familiar. Whenever I could ascertain the provenance of the specimen and its date, I have given it. The sequence shows that the process of self-divesting of the stripes from the hoofs upwards, which we can trace in the Burchelline Zebras from Grant's variety in North-east Africa downwards (text-figs. 144-8, *supra*), continued in operation amongst the Quaggas of Orange River and Cape Colony. Scanty as the evidence is, it renders it clear that if we had more specimens we could trace every stage in the process and we would find, that as in British East Africa the Zebras vary from area to area, so was it also with the Quaggas of Cape Colony. In addition to the reproductions of the extant specimens in museums as well as York's photograph of the female Quagga which lived in the Regent's Park from 1851 to 1872, I have reproduced the chief pictures of Quaggas drawn from living specimens. There has been in the past much discussion as to whether the drawings of Edwards, Cornwallis Harris, Hamilton Smith, and Daniell are trustworthy, because the animals portrayed differ in coloration *inter se* and also from the extant museum specimens. But a comparison of the illustrations from the pictures with those from the extant specimens, and from York's photograph, and the descriptions of such men as Cornwallis Harris, will convince the reader that the pictures of Edwards, Harris, Daniell, and Hamilton Smith, though differing from each other, and from some of the extant specimens, show forms quite in keeping with what might be expected in other specimens of Quaggas.

Cornwallis Harris, who had studied the Quagga from life in its haunts ('Wild Sports of Southern Africa,' p. 48), has left us in his 'Portraits of the Game Animals of Southern Africa' (1841) a picture of an animal (text-fig. 180, p. 586) with less striping than Daniell's (text-fig. 179). Harris was drawing from animals that he saw around him, and had he not seen such variations, he would have given us an animal striped like the skin drawn by himself (text-fig. 175, p. 583). Again Hawkins †, in his drawing from life of the Knowsley quaggas (text-fig. 174), shows animals of different degrees of striping. But his picture is in accord with the evidence of the extant skins.

III. The Vienna specimen (text-fig. 158, p. 568), a female. This specimen has been fully described by Dr. Lorenz (P. Z. S. 1902, vol. i. pp. 32 *sqq.*), with an illustration taken from a photograph made for Dr. Lorenz by Herr Custos Marktanner, of Gratz, from whose negative the photograph here reproduced is also taken (having been obtained for me by Dr. Karl Toldt, of the Vienna

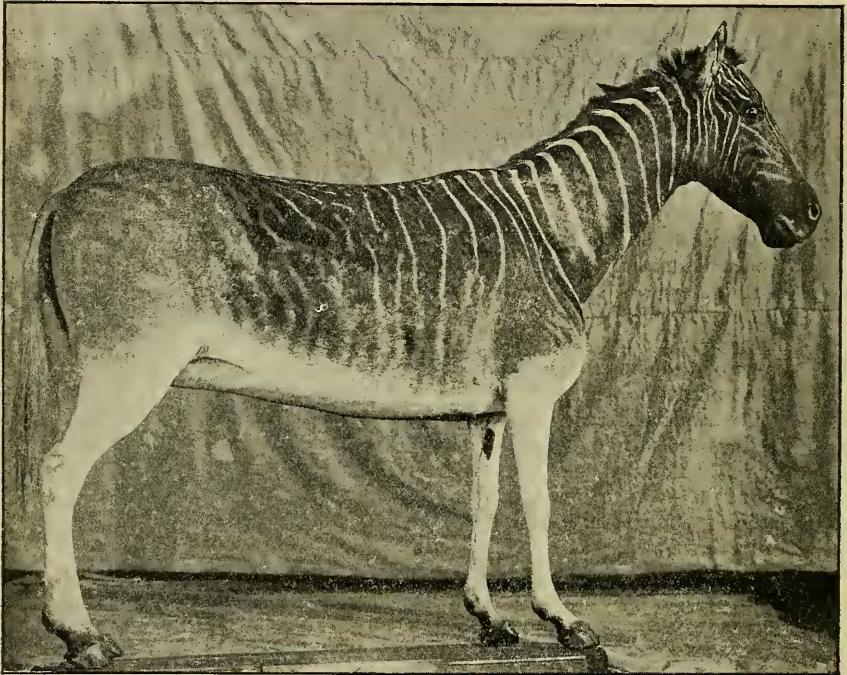
* Mr. G. Renshaw (Nat. Hist. Essays, 1904, p. 192) gives both in his list, and one at Berne (p. 191). But the Director of that Museum tells me that this is a mistake.

† 'Gleanings from the Menagerie and Aviary at Knowsley Hall' (J. E. Gray and Waterhouse Hawkins: Knowsley, 1851).

Museum, in 1906). The specimen was procured by Ecklon in 1836 (who had purchased for Munich its specimen in 1835).

IV. The *Tring* specimen (text-fig. 159). Dr. P. L. Slater, F.R.S., described and figured this specimen (P. Z. S. 1901, vol. i. p. 166). My illustration is from a photograph given by the Hon. Walter Rothschild, M.P. to Mr. R. I. Pocock, who has kindly allowed me to embody the following notes on this important specimen (pp. 569-70). Dr. Slater stated that this

Text-fig. 158.



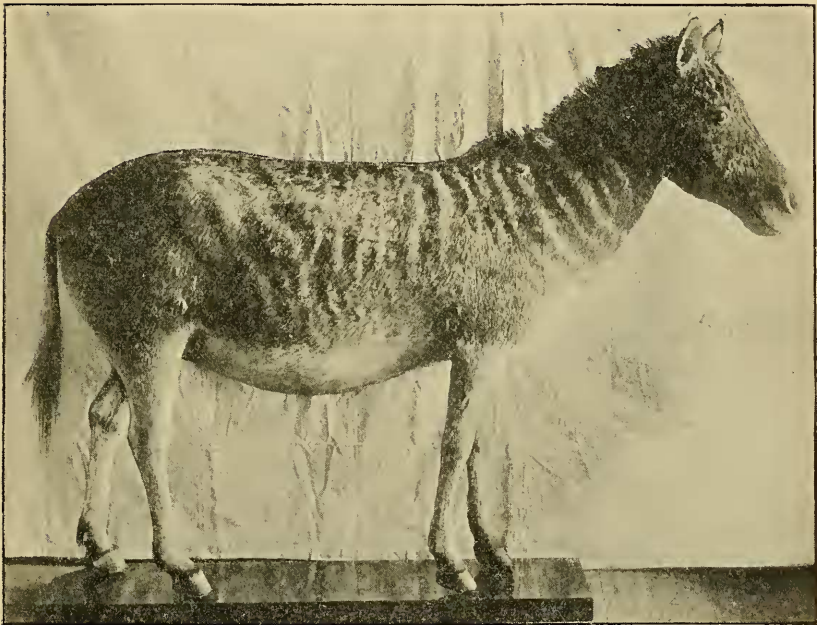
The Vienna Quagga (female), 1836.

specimen was the animal which lived in the London Zoological Gardens from 1851 to 1872. I am also indebted to Mr. Pocock for the facts relating to the history of this specimen and its supposed identity with either the quagga which died in the Regent's Park in 1864 (Sir G. Grey's specimen) or the one which died in 1872. The question is fully discussed (*infra*, pp. 572-5) where I treat of the British Museum specimen and that photographed by Fred. York.

"The chief points to be noticed about this Quagga are the following. The general colour is practically the same as in the

type of *E. quagga greyi* in the British Museum, that is to say, the stripes are dark brown, the interspaces paler creamy brown, the belly and legs whitish with a dark rim above the hoofs and dark hair at the back of the fetlocks. The stripes on the neck are moderately broad and some of them at least are double. The lower half of the shoulder is unstriped; and on the anterior portion of the body behind the shoulders the stripes are short, but posteriorly they become progressively longer and retain their distinctness as far back as the hind-quarters, exhibiting most clearly in the posterior

Text-fig. 159.



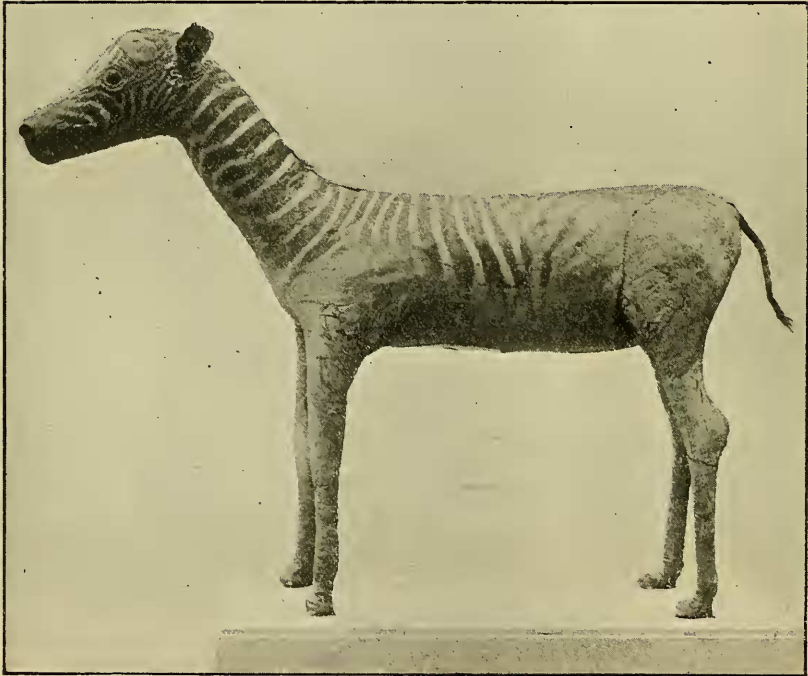
The Tring Quagga.

half of the body the backward inclination so characteristic of so-called Zebras of the Burchelline group. The last long stripe that is visible slopes backwards from a point a little in front of the stifle-joint towards the root of the tail, and appears to represent the stripe in a specimen of Chapman's Quagga which Prof. Ewart called the "intermediate flank stripe." Below this the hind-quarters seem to show traces of at least one abbreviated stripe, recalling the abbreviated stripes on this area in typical *E. quagga burchelli*.

"It is the persistence and distinctness of both the vertical and oblique stripes on the body that make the Tring Quagga exceptionally interesting. In these particulars, coupled with the width

of the interspaces between the stripes on the body and neck, it more resembles some of the recorded examples of *E. quagga burchelli* than any of the extinct Quaggas hitherto described and figured. It surpasses even the Vienna specimen in the cogency of the evidence it supplies of the closeness of the affinity between the extinct and existing members of this species. Apart, indeed, from its browner tint, due to the lightening of the stripes and the darkening of the interspaces, I cannot detect one single important character in which this Quagga differs, for example, from the specimen of Burchell's Quagga in the Bristol Museum.

Text-fig. 160.



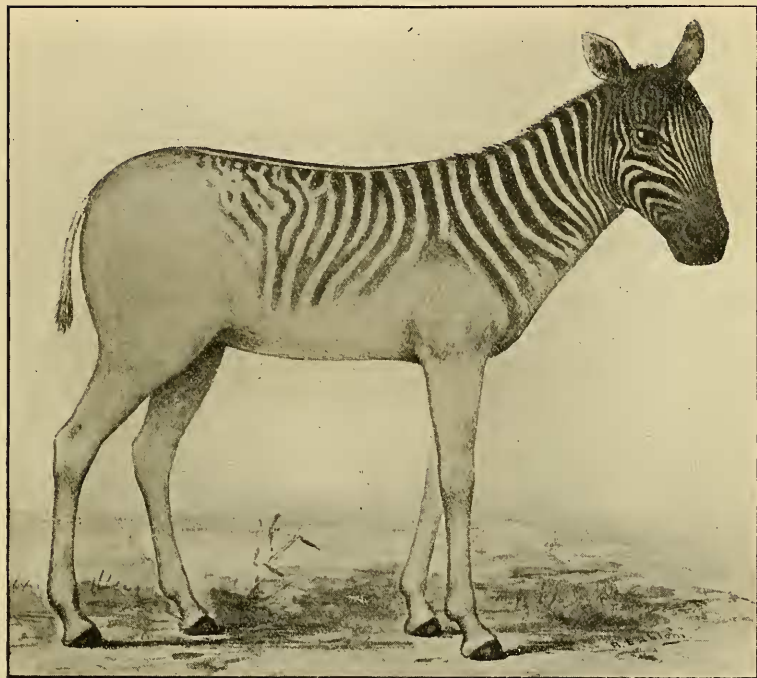
The Stockholm (Sparrman's) Quagga, 1775.

"I am greatly indebted to Mr. Rothschild for giving me more than one opportunity of examining this Quagga at Tring and also for very kindly supplying me with a photograph of the animal from which Prof. Ridgeway has had the subjoined block prepared."

V. **The Stockholm specimen** (text-figs. 160 & 161). This specimen has a peculiar interest, as it is not only the oldest extant specimen, but is the "full-grown fetus" brought home by

Sparrman in 1775*. For the two illustrations I am indebted to my friend Prof. Dr. Lönnberg, the Keeper of the Natural History Museum, Stockholm, who has also given me the notes here embodied. Text-fig. 160 is from a photograph taken before the dust of a century was removed from the animal. Text-fig. 161 is from a painting made by the Stockholm artist Mr. S. Ekblon for Dr. Lönnberg of the specimen after it was cleaned. Dr. Lönnberg has most generously put this picture at my disposal, and he tells me

Text-fig. 161.



The Stockholm (Sparrman's) Quagga (from a painting).

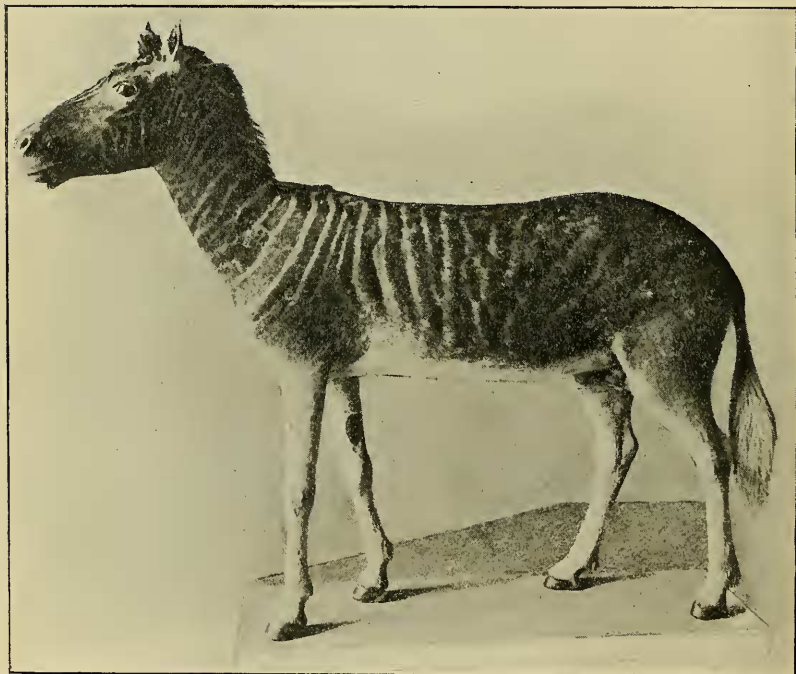
that "it represents a careful copy of the pattern of the right side, which is not fully identical with that on the left" (represented by the photograph, text-fig. 160). "The light patch on the rump in the photograph is due to the fact that the specimen had not been fully cleaned when the photographer had it." In answer to my query Dr. Lönnberg writes that "the brown of the stripes may be a little bleached, but only a little; the light ground colour is of

* 'Voyage to Cape of Good Hope, etc.', Engl. trans. (Perth, 1789), vol. i. p. 190. Sparrman gives its measurements: "from ears to tail 31 inches; height at loins 22."

course not altered. Sparrman says in his narrative that the colours of this foetus were 'fresher,' *i. e.* brighter, than in full-grown animals of the same kind." The exact locality is not mentioned, but Sparrman relates that he saw the first quagga at Swellendam, and in this connection he mentions this foetus, although he says only that he brought it home "from the Cape."

VI. **The Wiesbaden specimen** (text-fig. 162) was bought in 1865 from Frank, the Amsterdam dealer, for one hundred florins. It is a male. The provenance is simply "South Africa."

Text-fig. 162.



The Wiesbaden Quagga (male), 1865.

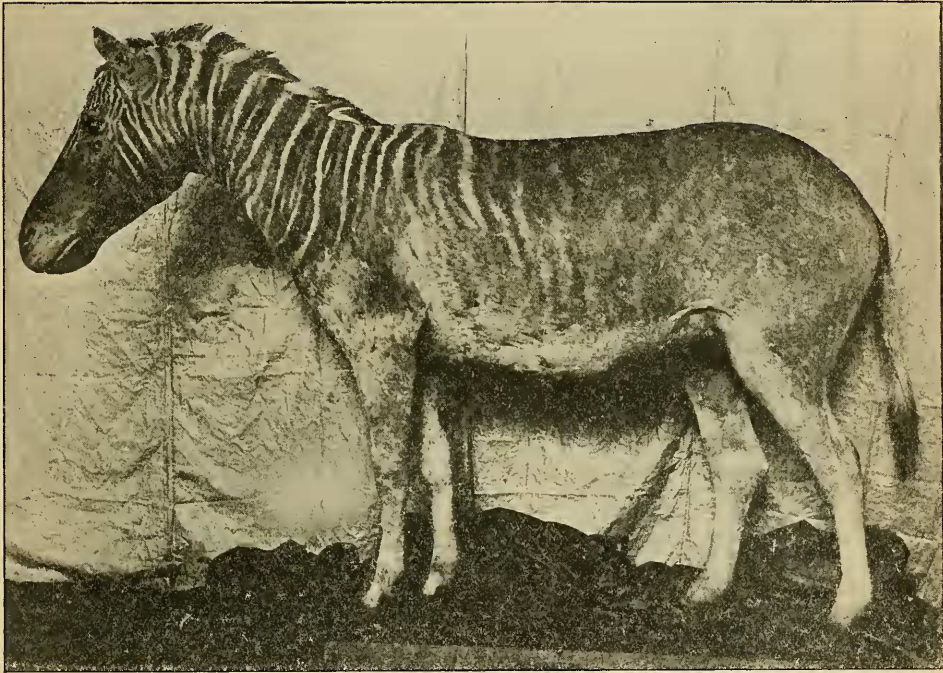
This information and the photograph I owe to the kindness of Dr. Lampe, Custos of the Wiesbaden Museum.

VII. **The British Museum specimen** (text-fig. 163). Mr. Lydekker ('Guide to the Specimens of the Horse Family (Equidæ),' p. 34), writes:—"The species is represented in the collection by the mounted skin and the skeleton of a male formerly living in the Zoological Gardens, Regent's Park. That animal, which was one of the last survivors of the species, was presented to the

Zoological Society by Sir George Grey, K.C.B., in 1858, and lived in the Menagerie in the Regent's Park till June 1864. The skin is exhibited in case no. 38 in the lower mammal gallery, and the skull on the opposite side of the same case."

Between this specimen and that at Tring there has been much confusion. In the P. Z. S. 1901, vol. i. p. 165, Dr. P. L. Sclater, F.R.S., stated that the female Quagga purchased on March 15th, 1851, by the Zoological Society died on July 7th, 1872, and was sold to Mr. E. Gerrard, and is now in the Zoological Museum at Tring. A photograph of this animal taken during its lifetime

Text-fig. 163.



The British Museum (Grey's) Quagga (male), 1858.

(1870) by York is reproduced on p. 166 of the volume just cited. Mr. Pocock accepted this statement as correct and reprinted it in his paper on the Cape Colony Quagga (*Ann. Mag. Nat. Hist.* (7) xiv. p. 324, 1904).

The Hon. Walter Rothschild, M.P., then wrote to Mr. Pocock to tell him that he had bought the Tring Quagga from Gerrard in 1889, understanding that it had been received in exchange from the Dresden Museum. Mr. Pocock wrote to Mr. Gerrard, and he informed Mr. Pocock that it came from the Leyden Museum.

Mr. Pocock wrote to Dresden, and the then Director replied that the Dresden Museum had never possessed a Quagga, and had never sold one to Gerrard either before, during, or after 1889.

All doubt on this matter is removed by the following letter from Gerrard to Mr. Pocock:—

Natural History Studios,
61 College Place, Camden Town,
London, N.W.,
June 12th, 1909.

Dear Sir,

The Quagga I sold to Tring was one I bought from Mr. Frank of Amsterdam. It was an old mounted specimen, and I remounted it. I do not know where Frank got it. The Quagga which died at the Zoo was made into a skeleton. The skin was bad. The skeleton is in the British Museum.

Yours truly,

EDW. GERRARD.

Dr. Harmer, F.R.S., on recently examining the specimen in the British Museum and comparing it with the animal shown in York's photograph, told me that he doubted if they were one and the same animal.

Mr. G. Dollman has kindly sent me the extract* from the Museum Register. It puts beyond doubt that the specimen is Grey's which died in 1864, years before York's photograph. Mr. Gerrard is therefore wrong, and so is Dr. Renshaw †, who states that the Museum specimen is the animal which died in the Gardens in 1839.

The statements prove the following conclusions:—

(i) In 1851 the Society purchased a *female* Quagga which died in 1872.

(ii) The skin was not preserved being in a bad state, but its skeleton was mounted, though it is not that now in the Natural History Museum.

(iii) In 1858 Sir George Grey presented to the Zoological Society a *male* Quagga which died in 1864. It is the mounted skin, skull and skeleton of this *male* which is now in the British Museum.

(iv) It is certain that York's photograph represents a specimen which was living in the Regent's Park. But as this photograph does not represent the stuffed specimen in the British Museum (Sir G. Grey's male), it must represent the female specimen bought in 1851, of which the skeleton was preserved but not the skin, which was in too bad a state.

(v) The Tring specimen is neither the female specimen which was in the Gardens from 1851 to 1872, nor the male presented by Sir G. Grey in 1858 and which died in 1864. It is the skin of a quite different animal.

(vi) Thus through the efforts of Mr. Pocock and Dr. Harmer's

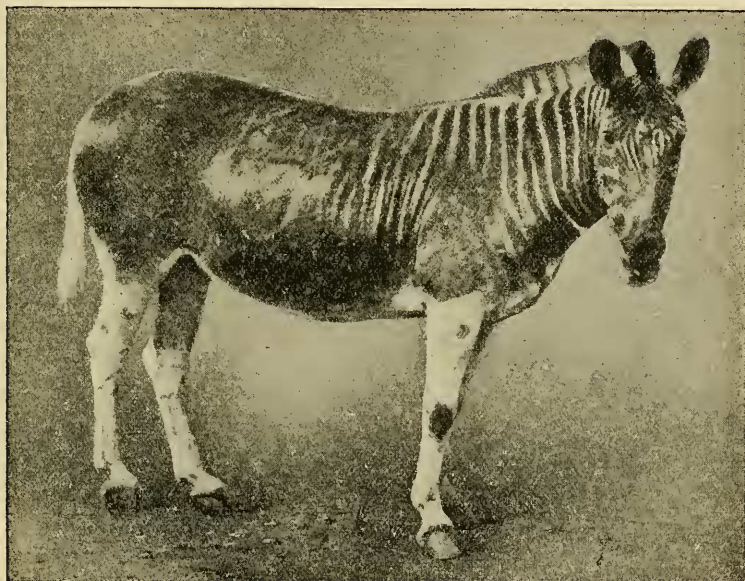
* The entry runs: "64.7.2.3, Reg. no. *Equus quagga*, male, stuffed skin and skeleton, purchased of the Zool. Soc. (Sir George Grey, 1858)."

† Nat. Hist. Essays, pp. 186-7.

sagacity we are enabled to add another specimen to the list of Quaggas preserved in our museums. Most fortunate it was that York photographed the female Quagga in the Gardens, for although her skeleton may be preserved in some museum, all record of her external appearance would have been lost.

VIII. **The Female Quagga photographed by York** (text-fig. 164). For this illustration I have to thank the Director of the British Museum, who has permitted me, with Mr. Lydekker's approval, to reproduce the fig. 22 in the 'Guide to the Specimens

Text-fig. 164.



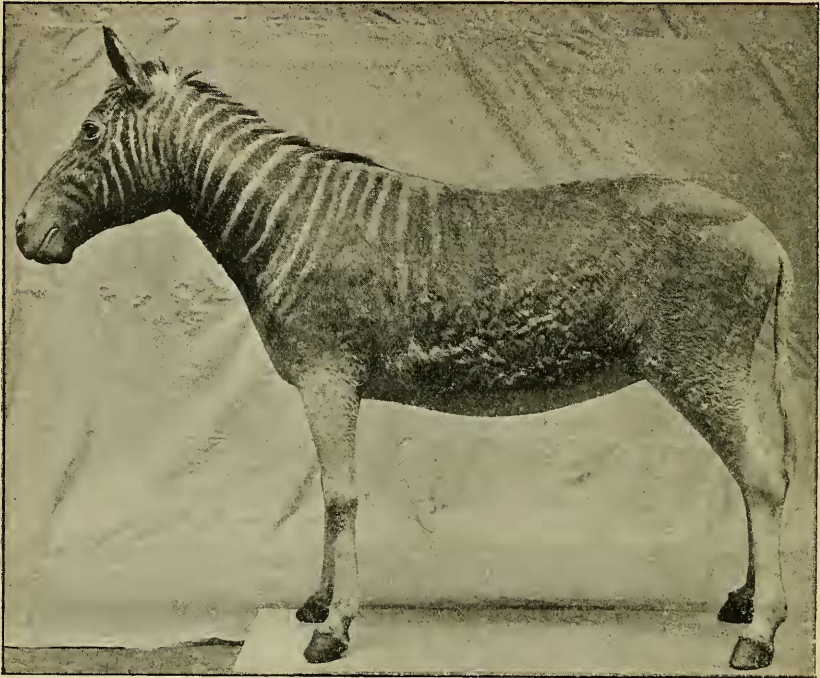
Female, Regent's Park (1851-72). Photographed from life by F. York.

of the Horse Family' (p. 33). From what has been said under "The British Museum specimen" *supra*, it is clear that York's photograph, taken (1870 or 1872) from the only living quagga ever photographed, represents the female which lived in the Gardens from 1851 to 1872, and not the specimen now in the British Museum.

IX. **The Edinburgh specimen** (text-fig. 165). The Edinburgh specimen has no provenance except Cape of Good Hope. It was purchased by the University of Edinburgh for their "College Museum" during the year ending June 1818, for the sum of one guinea, and it was afterwards transferred to the Royal Scottish

Museum, where it now is along with the rest of the old College Collection. I am indebted to the Director, Dr. Dobbie, F.R.S., and to Mr. G. P. H. Grimshaw for the photograph and information.

Text-fig. 165.



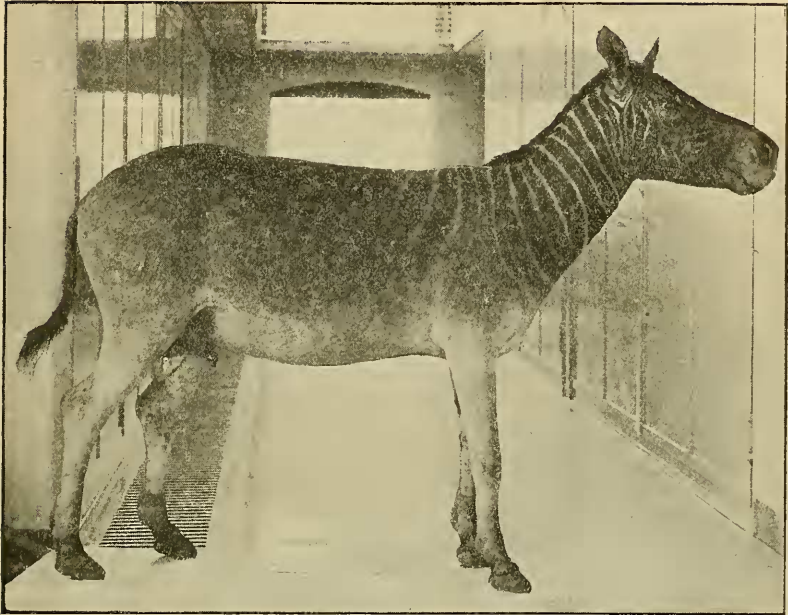
The Edinburgh Quagga, 1818.

X. **The Leyden specimen** (text-fig. 166) is from a photograph kindly given to me by my friend Dr. F. A. Jentink, F.M.Z.S., the Director of the Dutch State Museum of Natural History at Leyden. The animal was shot near Steenberg by Dr. van Horstok on June 15th, 1827. The skeleton of this fine animal (male) is likewise in the Leyden Museum.

XI. **The Paris specimen** (text-fig. 167) is from a photograph kindly given to me by Dr. Trouessart, the Director of the Paris Natural History Museum, to whom I am also indebted for the following account:—"Le quagga est venu (vivant) lors de la création de la ménagerie du Muséum de l'ancienne ménagerie du Roi à Versailles en 1793. A cette époque l'indication 'Cap de Bonne Espérance' semblait très suffisante." Dr. Trouessart has since published the specimen with an illustration in the 'Bulletin' * of the French National Museum.

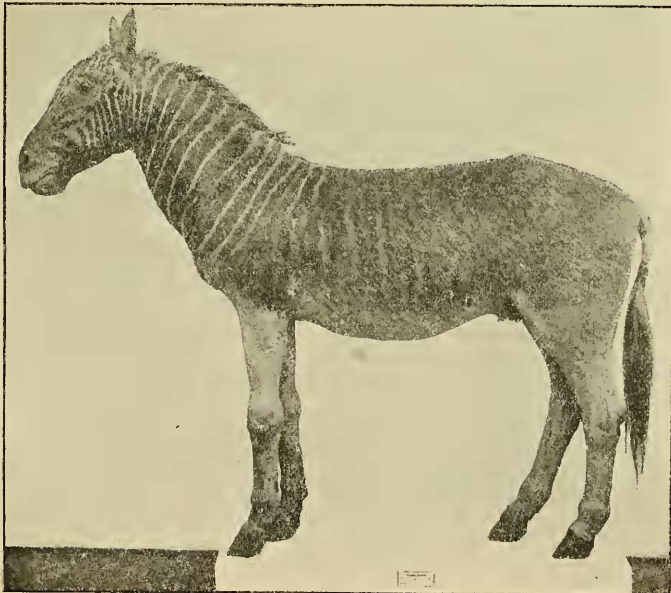
* 1906, xii, p. 449.

Text-fig. 166.



The Leyden Quagga (male), Steenbergen, 1827.

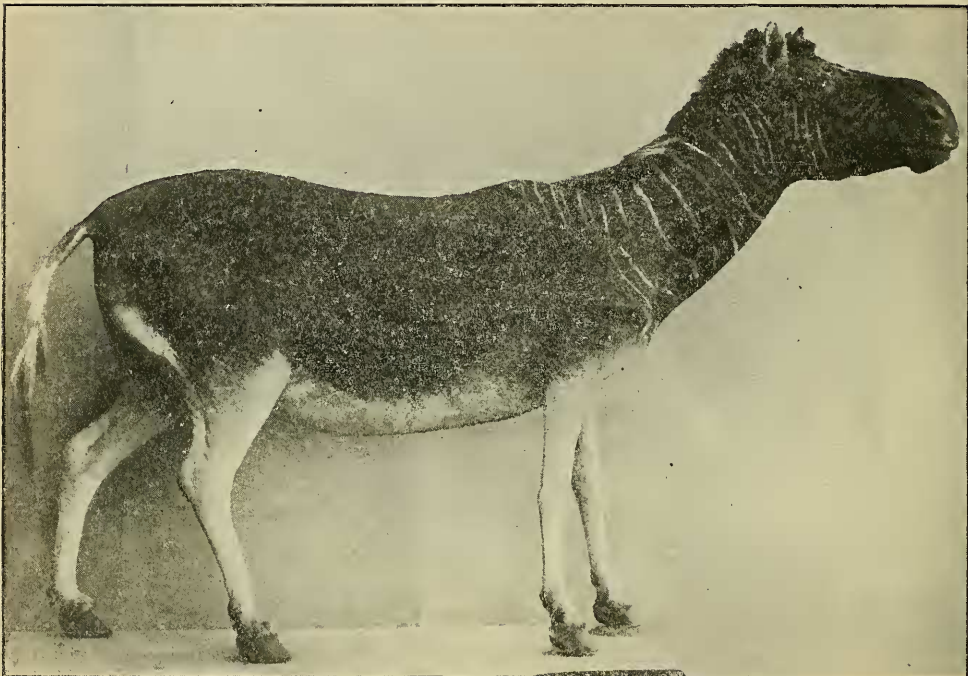
Text-fig. 167.



The Paris Quagga, 1793.

XII. **The Berlin Quagga** (text-fig. 168), a female, is that which died in the Berlin Zoological Garden in 1875. The skull and skeleton are also in the Berlin Museum as well as two other quagga skulls. Dr. Matschie, who kindly gave me the photograph,

Text-fig. 168.



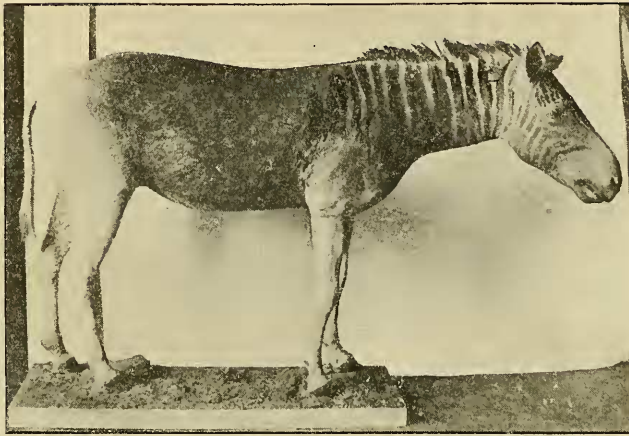
The Berlin Quagga (female).

informs me that the specimen has not been fully described. He considers that it belongs to the same type as the Vienna (*E. lorenzi*). "The ground-colour is burnt-umber; the bright stripes are very bright brown (sehr hell braun)."

XIII. **The Munich specimen** (text-fig. 169).—The illustration is from a photograph kindly sent to me by Dr. Hertzog, the Director of the Natural History Museum. The specimen was purchased by Ecklon in 1835, who in the following year procured the Vienna specimen.

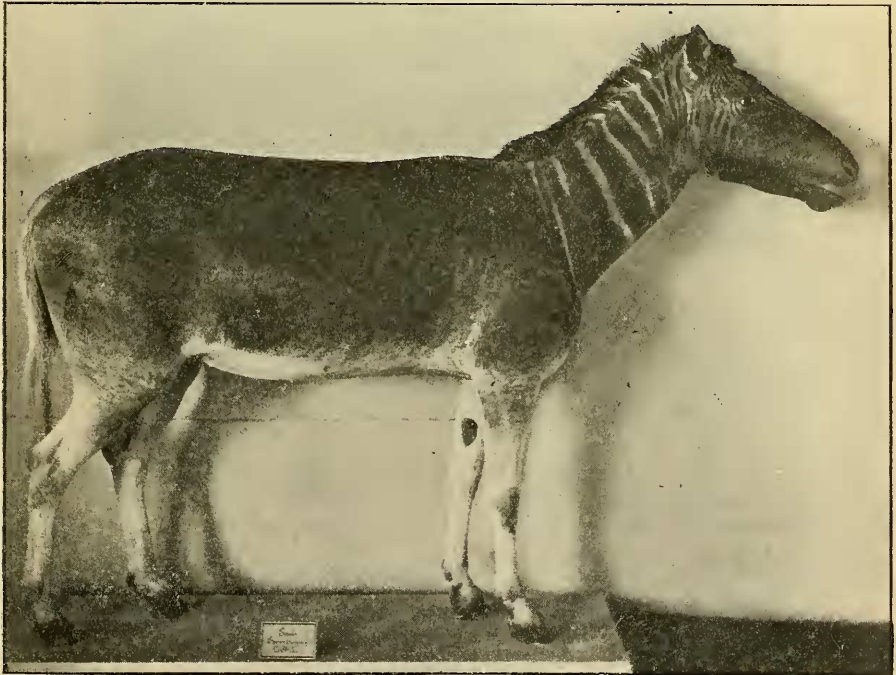
XIV. **The Amsterdam Quagga** (text-fig. 170).—The illustration is from a photograph kindly given to me by Prof. Dr. Kerbert. The specimen has been described and discussed by Mr. Lydekker (P. Z. S. 1904, vol. i. p. 430, text-fig. 86).

Text-fig. 169.



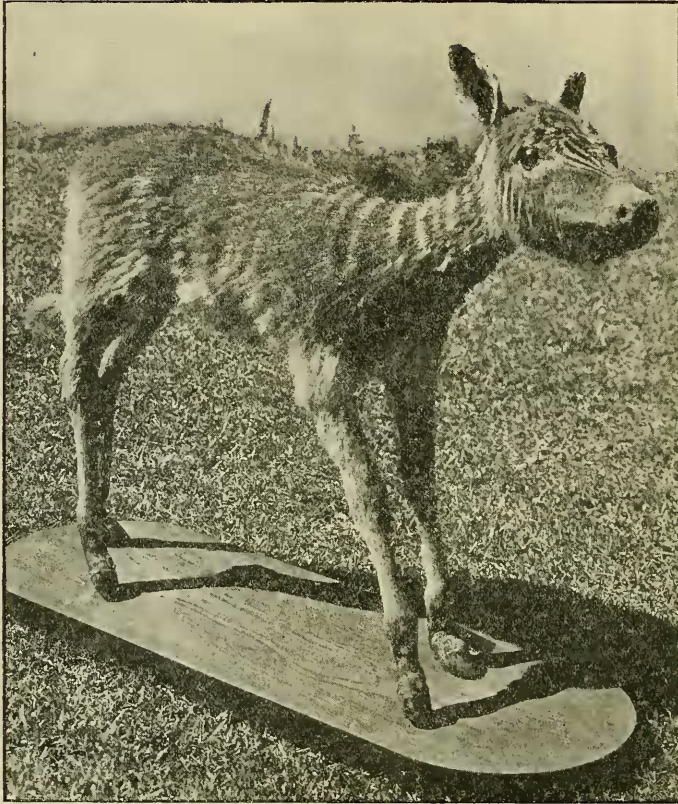
The Munich Quagga, 1835.

Text-fig. 170.



The Amsterdam Quagga.

Text-fig. 171.



The Cape-Town Quagga foal, Beaufort West, about 1860.

XV. **The Elgin Quagga** (text-fig. 172).—I published this head and neck in my 'Origin and Influence of the Thoroughbred Horse' (pp. 438 & 9, figs. 131-3), 1905.

1. **Edwards' Quagga**.—The illustration (text-fig. 173, p. 582) is from the drawing made by G. Edwards himself "from the living animal belonging to His Royal Highness the Prince of Wales" in 1751, and published in his 'Gleanings of Natural History,' London, 1758, p. 29, pl. 223. This drawing was reproduced and discussed by Mr. R. I. Pocock (Ann. Mag. Nat. Hist., Nov. 1904).

The figure is that given in my 'Origin and Influence of the Thoroughbred Horse,' p. 72, fig. 38.

Text-fig. 172.



Elgin Quagga: Kingwilliamstown, 1861.

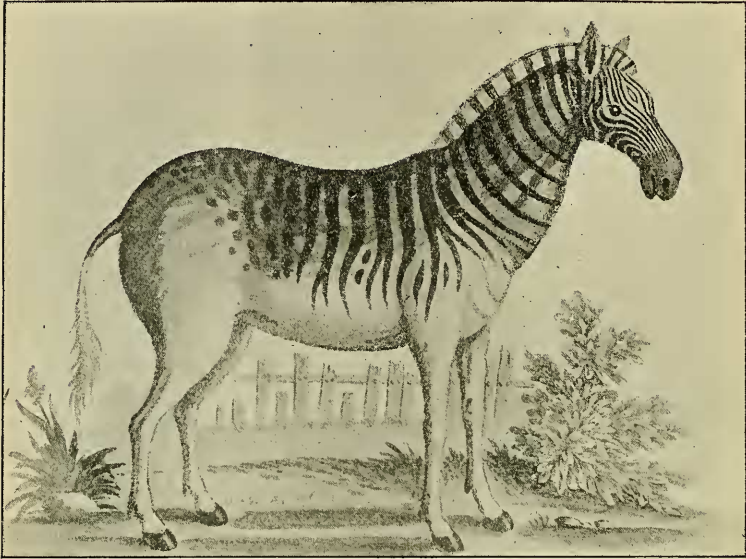
2 and 3. **The Knowsley Quaggas** (text-fig. 174, p. 582).—My illustration is from their portraits by Hawkins (*supra*, p. 567) in the 'Knowsley Menagerie.' The two animals are shown on one picture. One is more striped than the other, but the skin (text-fig. 175) might belong to a similar animal.

4. **Cornwallis Harris' Drawing of a Quagga Skin** (text-fig. 175), *cf.* p. 567. It is reproduced from the 'Portraits of the Game Animals of Southern Africa.'

5. **Lord Morton's Quagga.**—My illustration (text-fig. 176) is from a block made from Agasse's drawing for my friend Prof. J. Cossar Ewart, F.R.S. ('Penicuik Experiments,' p. 65).

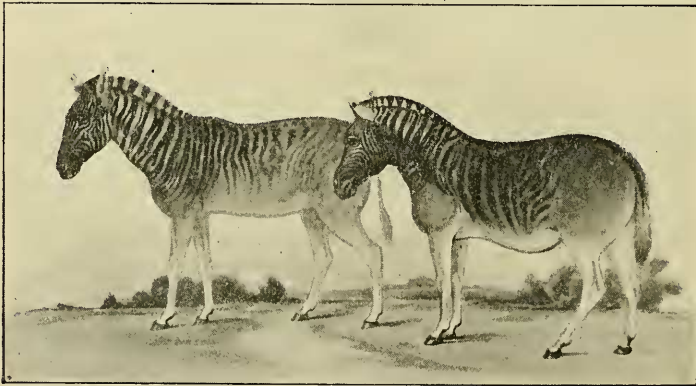
This animal belonged to Lord Morton in 1821 (see *Phil. Transactions*, 1821, p. 21). (*Cf.* 'Origin and Influence of the Thoroughbred Horse,' p. 457.)

Text-fig. 173.



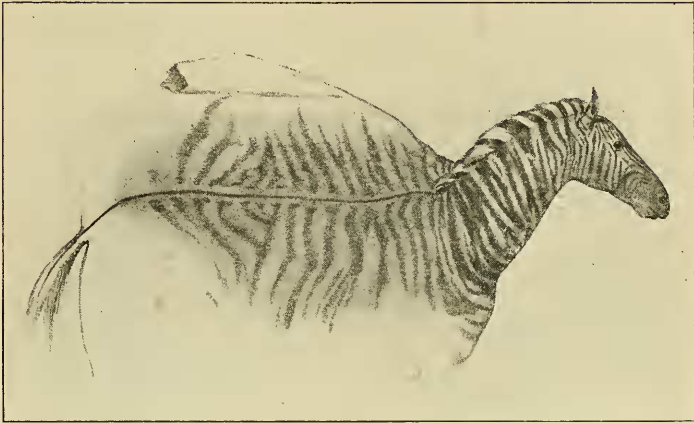
Edwards' Quagga, 1751 (from Edwards' drawing).

Text-fig. 174.



The Knowsley Quaggas, from Hawkins' drawing.

Text-fig. 175.



From Cornwallis Harris' picture
('Portraits of the Game Animals of Southern Africa').

Text-fig. 176.



Lord Morton's Quagga, 1821 (from Agasse's drawing).

6. Buffon's Quagga.—My illustration (text-fig. 177) is from that in Buffon's 'Histoire Naturelle,' vol. x. p. 112 *sqq.*, pl. ii. (1787). The description of the quagga there given and the drawing from which the engraving was taken (here reproduced)

Text-fig. 177.

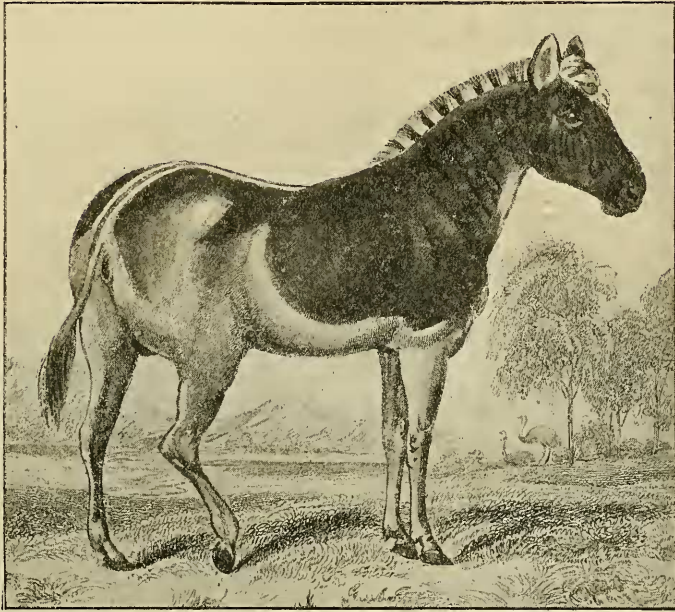


Buffon's Quagga: from Gordon's drawing.

were obtained from a Mr. Gordon, who (dans le pays des Bosjemans fort éloigné de toute habitation) made a drawing from a young quagga, which he had cut off from a herd of females with their foals, and which followed his horse (p. 115).

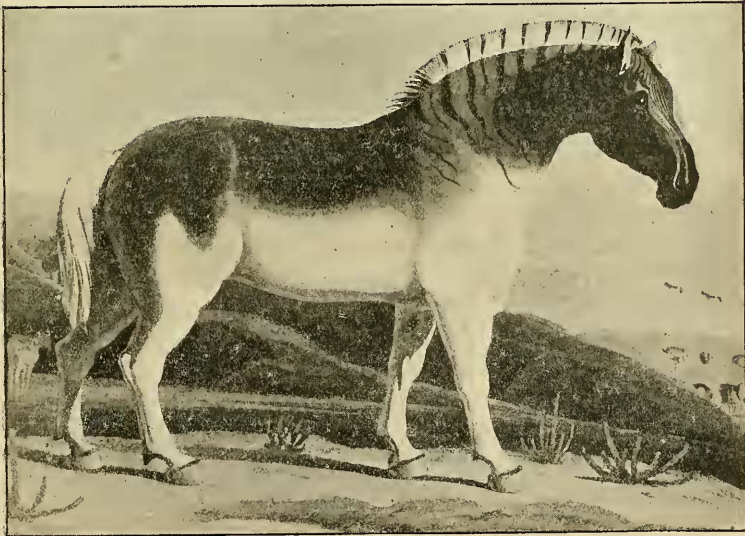
7. Hamilton Smith's Quagga (*supra*, p. 567). (Text-fig. 178.)

Text-fig. 178.



Hamilton Smith's drawing, 1840*.

Text fig. 179.



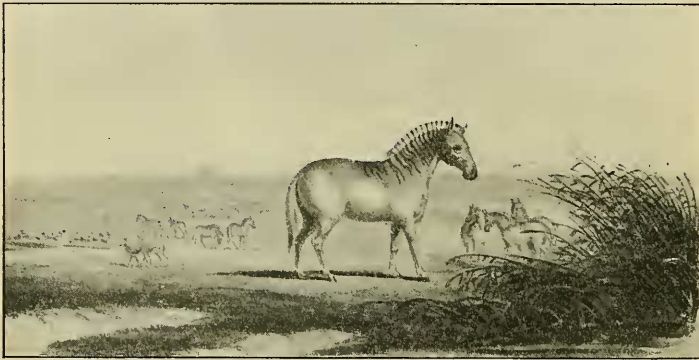
Daniell's Quagga : from a drawing anterior to 1804.

* 'Horses,' pl. xxiv.

8. **Daniell's Quagga.**—The illustration (text-fig. 179, p. 585) is a reduced facsimile from the drawing by Samuel Daniell in his 'African Scenery' (1804–8), no. 15. The picture has been reproduced and discussed by Mr. Pocock (Ann. Mag. Nat. Hist., Nov. 1904).

9. **Cornwallis Harris's Quagga** (text-fig. 180) is a reproduction of Harris' drawing in the 'Portraits of the Game Animals of Southern Africa' (*supra*, p. 567).

Text-fig. 180.



From Cornwallis Harris' drawing.

This survey of the extant skins and the pictures of the Quaggas of Orange River and Cape Colony, and the comparison of the illustrations with those of the Burchelline Zebras, leads irresistibly to the conclusion that every area has its own variety due to environment, that we must be slow to make new species or even subspecies, and that Mr. Pocock was right in maintaining that the Quaggas of Orange River and Cape Colony were not specifically distinct from the Burchelline Zebras.

3. Contributions to the Study of the Equidæ; iii. On a portion of a fossil Jaw of one of the Equidæ. By Prof. WILLIAM RIDGEWAY, M.A., Sc.D., F.B.A., LL.D., Litt.D.*

[Received April 21, 1909.]

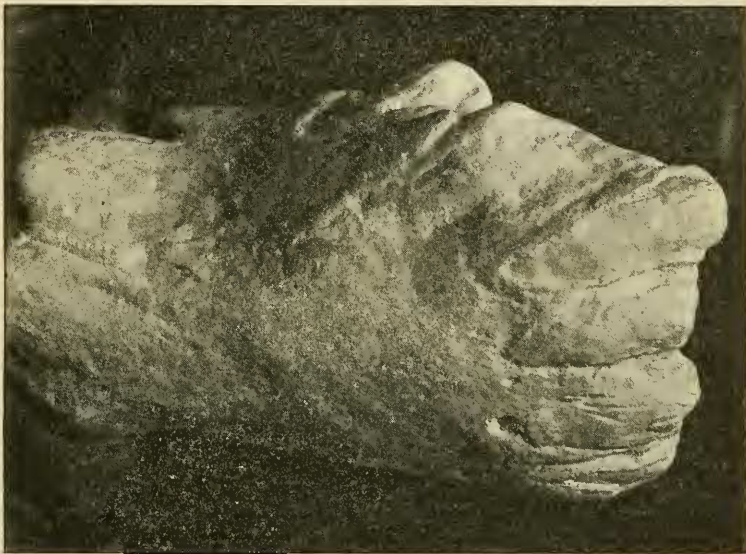
(Text-figure 181.)

By the kindness of Mr. A. C. Hollis, secretary to the High Commissioner of British East Africa, through my friend Mr. C. W. Hopley, C.M.G., Assistant-Commissioner at Nairobi, I am

* Communicated by Dr. P. CHALMERS MITCHELL, M.A., F.R.S., F.Z.S.

enabled to publish a most interesting fragment of the fossil jaw of what was undoubtedly one of the Equidæ. It was found in 1906 "by a Mr. W. A. Macgregor in the Morendat River near Naivasha." Mr. Macgregor gave it to Mr. Hollis. I am informed by Professor Gregory of Glasgow, who has worked in British East Africa, that the gravels of the Morendat are late Tertiary. The fragment here shown (text-fig. 181) is the fore part of the under jaw. Unfortunately it does not extend back beyond the diastema and include any of the premolars or molars, but five of the six incisors survive and also the canine on the right side, the canine and second corner incisor on the left side being lost.

Text-fig. 181.



Fragment of a fossil jaw ; River Morendat, British East Africa.

Allowing for the loss of a small portion, the breadth across the jaw at the corner incisors is exactly two inches. The distance from the corner incisor to the canine is very small, not more than a quarter of an inch. This specimen is very interesting as it is, so far as I know, the only fossil remains of a mammal as yet obtained from British East Africa, and at the time of its discovery was the first from any part of East Africa. But the Germans have lately made some discoveries. The only mammal fossil from Central Africa as yet known, is a fossil tooth of a giraffe.

Close to the area where it was found there still survive representatives of all three species of Zebra—*E. zebra* or the Mountain

Zebra, Grant's variety of Burchell's Zebra, and Grévy's Zebra; and it is not improbable that in this jaw we have a relic of an ancestor of one or more or of all these species.

Is it possible to form any estimate of the size of this animal, which I propose to call *E. hollisi*?

Let us compare the few measurements which we can make with those of its living relatives. The distance across the four completely surviving incisors in the fossil is one and three-quarter inches. The same measurement in my skull of a Grévy stallion gives two inches, and in that of my Grant stallion two and three-eighths inches. The interdental space between the canine and the nearest incisor in the fossil *E. hollisi* is about a quarter of an inch, in the Grévy three-eighths, in the Grant nearly an inch. Thus, so far as these very inadequate measurements indicate, the animal was more like the Grévy Zebra than the Grant, an inference quite in keeping with the view that the stripe-system in the Grévy is much older than in the Burchell family of Zebras.

As regards the actual size of the *Equus hollisi*, we can form no estimate from the jaw measurements. Thus the Grévy stallion, the measurements of the jaw of which I have just cited, stood 4 feet 9½ inches (14·1½ hands) or just the height of the true Libyan horse, that is the small "Arab" not increased in height by crossing with Asiatic horses. On the other hand, the Grant's Zebras of East Africa seldom reach more than 4 feet 2 inches (12·2 hands), yet the measurement of the front of the jaw in the latter is distinctly larger than that of the Grévy stallion. Thus from the present scanty data, we cannot form any estimate of the height of *E. hollisi*, for although the front of the lower jaw is much smaller than that of *E. granti*, it is quite possible that it, like the Grévy Zebra, may have been a much larger animal.

4. On a New Race of Deer from Sze-chuen.

By R. LYDEKKER*.

[Received April 8, 1909.]

(Plate LXIX.†)

Shortly before his death, I received from the late Mr. J. W. Brooke a communication regarding a so-called "white deer" inhabiting Sze-chuen, which was stated to be no albino, but, in my correspondent's opinion, a new species. In February of the present year, Captain Malcolm McNeill called at the Natural History branch of the British Museum, and informed me that he had just returned from Sze-chuen, where he had seen a small party of these deer, out of which he succeeded in shooting a hind.

* Communicated by permission of the Trustees of the British Museum.

† For explanation of the Plate see p. 590.



CMP-EEJ

Miles & C^o Imp

SZE-CHUEN HANGUL (FEMALE)
CERVUS CASHMIRIANUS MACNEILLI

Of this hind he brought home the skin, skull, and limb-bones, which have been secured for the British Museum and form the subject of the present communication. Captain McNeill described the deer as being nearly the size of a Wapiti; and this estimate seems to be approximately borne out by the skull and skin, the former of which, although immature, is rather larger than the skull of an adult red deer hind. Unfortunately, Captain McNeill was unable to furnish any information with regard to the form of the antlers of the stag.

The general characters of the skin indicate a deer akin to the Hangul (*Cervus cashmirianus*) of Kashmir and Kishtwaz. The coat is, for instance, of the same dense and close character, with the individual hairs ringed with dark and light in their terminal halves, so as to give a speckled appearance to the body-fur. There is the same narrow white area on the buttocks, bordered by a darkish band, which is continued down the middle line of the short tail, and there is a similar dark mane on the neck, continued as a dark line for some distance down the back.

The Sze-chuen deer is, however, a much lighter-coloured and a more fully speckled animal than the typical Hangul. The general colour is grey fawn, becoming paler on the limbs, of which the backs and inner sides are nearly white. The individual hairs on the body have also a greater number of light rings; and the speckling is as well-developed on the flanks and neck as on the back, whereas in the Kashmir Hangul the speckling is almost obsolete in the regions first-named. In both forms the tips of the hairs are, however, always light, although on the flanks and neck of the Kashmir stag these tips are but little paler than the general body-colour. On the back the dorsal stripe of the new deer stops short a little behind the shoulder, instead of continuing as a more or less distinct line to the rump. The Sze-chuen deer lacks the white under-lip of its Kashmiri relative; but, on the other hand, the whole throat is much lighter than the general body-colour, instead of being quite as dark, or darker, in the stags, at any rate, of the typical Hangul. Then again, the whole of the under-parts of the Sze-chuen deer are dirty white, whereas in the Kashmiri animal the abdomen alone is white, while the lower surface of the chest is darker than the back. Certain differences are observable in regard to the extent of the white and black of the buttocks when the Sze-chuen skin is compared with those of the Kashmir Hangul in the Museum, but these may be merely individual. The gland on the hind cannon-bone is pale chestnut in the new deer, and thus shows out, against the grey fawn, much more conspicuously than in the typical Hangul.

The skin of a second hind in the possession of Captain McNeill agrees in all essential characters with the specimen described.

So far as the present specimens go, the Sze-chuen deer may be defined as follows:—

—Allied to *Cervus cashmirianus*, but much paler and more profusely speckled; the general colour being grey fawn, becoming

whitish fawn on the throat and limbs, and the speckling as fully marked on the neck and flanks as on the back. No white on the chin; but the whole of the under-parts dirty white, instead of merely the abdomen. Dark dorsal line stopping short about the middle of the back.

For the present, at any rate, I propose to regard the Sze-chuen "white" deer as a race of the Hangul, under the title of *Cervus cashmirianus macneilli*. The occurrence in Sze-chuen of a representative of the Hangul is paralleled by the occurrence in the same province of a local race of the Sambar.

EXPLANATION OF PLATE LXIX.

Cervus cashmirianus macneilli, from the type female from Sze-chuen in the British Museum (Natural History).

5. The Batrachians and Reptiles of Matabeleland.

By E. C. CHUBB, F.Z.S.

[Received April 28, 1909.]

The following list is based entirely upon material in the Rhodesia Museum, Bulawayo, and is intended to give some idea of the Batrachia and Reptilia inhabiting this region, although it cannot claim to be more than tentative, for as soon as extensive collections are made in various parts of the country there will, no doubt, be many species to add.

The localities vary in altitude between 2000 and 4500 feet; the latter figure representing the height of Bulawayo.

In a previous paper dealing with the Mammals of this area* an allusion was made to the probability of the various geological formations supporting distinct faunas, and this appears to be borne out to a remarkable extent by the lizards, no single species of which has as yet been found common to our two principal local formations, viz., granite and schist. Below is given a list of those forms which I have had an opportunity of observing in their haunts; it is arranged to show their habitats according to these two formations.

GRANITE.

Homopholis wahlbergii.

Pachydactylus affinis.

Agama kirkii.

Platysaurus guttatus.

Gerrhosaurus validus.

Mabuia quinquecinctata.

„ *varia*.

SCHIST.

Pachydactylus bibronii.

Agama distanti.

„ *atricollis*.

Gerrhosaurus flavigularis.

Mabuia striata.

* P. Z. S. 1909, p. 113.

The Matabele names are given wherever it has been possible to ascertain them with certainty, but the natives are not so well acquainted with the names of lizards and snakes as they are with those of mammals and birds. In reading these, it must be remembered that "c," "q," and "x" represent clicks, as in Zulu.

Among the numerous donors of specimens to whom the Museum is indebted, should be specially mentioned Messrs. R. Edge and G. Dally for collections made in the vicinity of Bulawayo.

I must express my warmest thanks to our Vice-President, Mr. G. A. Boulenger, F.R.S., who has been good enough to examine the collection and confirm or correct my determinations.

BATRACHIA.

1. BUFO REGULARIS Reuss.

- a.* Bulawayo.
 - b, c.* Crombie's Store, 16 miles S.E. of Bulawayo, 18 Oct. 1907.
 - d.* World's View, Matopos, April 1908.
- "Ixoxo" is used for all frogs and toads.

2. BUFO CARENS A. Smith.

- a.* Bulawayo.
- b-e.* Crombie's Store, 18 Oct. 1907.
- f.* Kana River, 20 Nov. 1907.

3. PHRYNOMANTIS BIFASCIATA A. Smith.

- a.* Bulawayo, 3 Dec. 1907.
- b.* Shangani River, 28 Nov. 1907.
- c.* Gonda's, Shangani River, 3 Dec. 1907.

4. BREVICEPS MOSSAMBICUS Peters.

- a-c.* Bulawayo.
- d, e.* Near Gwamayaya River, 21 Nov. 1907.

5. RANA DELALANDII D. & B.

- a-c.* Bulawayo.
- d.* Gwamayaya River, 13 Nov. 1907.

6. RANA ANGOLENSIS Bocage.

- a.* Bulawayo, 6 Sept. 1907.
 - b.* Crombie's Store, 18 Oct. 1907.
 - c, d.* World's View, Matopos, April 1908.
 - e, f.* Gwamayaya River, 13 Nov. 1907.
- A number of tadpoles were taken with "b" on Oct. 18th.

7. RANA ADSPERSA Bibr.

- a-d.* Bulawayo.
- e.* Gwamayaya River, 22 Nov. 1907.

8. *RANA MASCARENIENSIS* D. & B.

a. Swena's, Gwamayaya River, 22 Nov. 1907.

9. *PHRYNOBATRACHUS NATALENSIS* A. Smith.

a. World's View, Matopos, April 1908.

b-r. Kana River, 20 Nov. 1907.

s-x. Gwamayaya River, 13 Nov. 1907.

10. *CASSINA SENEGALENSIS* D. & B.

a. Kana River, 20 Nov. 1907.

11. *CHIROMANTIS XERAMPELINA* Peters.

a. Victoria Falls.

This species was observed to change colour in different lights after the manner of a chameleon, though to a less degree.

REPTILIA.

CHELONIA.

1. *CINIXYS BELLIANA* Gray.

a. Near Shangani River, Nov. 1907.

b, c. Essexvale, March 1909.

"Ufutu" is the name applied to all tortoises.

2. *STERNOTHLERUS NIGRICANS* Donnd.

a. Near Gwamayaya River, 22 Nov. 1907.

b. Near Gwelo River, 24 Nov. 1907.

3. *TESTUDO PARDALIS* Bell.

a. Near Gwamayaya River, 23 Nov. 1907.

EMYDOSAURIA.

4. *CROCODILUS NILOTICUS* Laur.

The crocodile is common in most of the rivers.

"Ingwenya."

LACERTILIA.

5. *LYGODACTYLUS CAPENSIS* A. Smith.

a. Bulawayo, 24 Oct. 1907.

6. *HOMOPHOLIS WAHLBERGII* A. Smith.

a. World's View, Matopos, April 1908.

b. Mazeppa Mine, Gwanda.

The first example was obtained from a hole in the trunk of a tree; the species is probably arboreal.

7. *PACHYDACTYLUS BIBRONII* A. Smith.

a. Bulawayo.

b. Springvale Farm, 16 miles S.E. of Bulawayo, 10 June 1907.

This is our commonest gecko; it is usually found in houses and huts.

"Amacanda-pobolo."

8. *PACHYDACTYLUS AFFINIS* Blgr.

a. Rhodes' Park, Matopos, April 1908.

9. *AGAMA ACULEATA* Merr.

a. Bulawayo, March 1907.

All our species of *Agama* possess the property, to a greater or less extent, of changing their colour.

10. *AGAMA DISTANTI* Blgr.

This is the commonest *Agama* at Bulawayo. It runs about the ground during the heat of the day, and at other times lives in holes, usually under stones, where its eggs are laid during October and November.

11. *AGAMA KIRKII* Blgr.

a, b (♂, ♀). Mt. Silozi, Matopos, April 1908.

c-e. Khami River, Oct. 1907.

Lives among the rocks and is commonly found on granite kopjes.

12. *AGAMA ATRICOLLIS* A. Smith.

a-f. Bulawayo, Sept. 1907.

Arboreal and common.

"Untulo."

13. *ZONURUS CORDYLUS* Linn.

a. Bulawayo, 27 Sept. 1907.

14. *PLATYSAURUS GUTTATUS* A. Smith.

a-g (♂, 6 ♀). Mt. Silozi, Matopos, April 1908.

h, i (2 ♀). Colleen Bawn Mine, Gwanda, Dec. 1908.

Found only on the granite kopjes where it is fairly common.

15. *VARANUS ALBIGULARIS* Daud.

a. Bulawayo, 3 Feb. 1908.

b. Bulawayo, March 1909.

Found among rocks on granite kopjes and also on trees.

"Imbulu."

16. *VARANUS NILOTICUS* Linn.

a. Bulawayo, April 1907.

b. Yg. Bulawayo, 8 March, 1908.

Almost entirely aquatic.

"Uxamu."

17. *NUCRAS TESSELLATA* A. Smith.

a-c. Bulawayo.

18. *ICHNOTROPIS LONGIPES* Blgr.

a. Bulawayo, 28 Sept. 1907.

b. Khami River, Oct. 1907.

19. *GERRHOSAURUS VALIDUS* A. Smith.

a. Mt. Silozi, Matopos, April 1908.

b. Empandene, Aug. 1908.

Lives among rocks on granite kopjes.

"Isiquisa."

20. *GERRHOSAURUS FLAVIGULARIS* Wiegman.

a-e. Bulawayo.

f. Empandene.

Fairly common, may be seen running about the ground among the grass during the warm part of the day.

"Isiquisa."

21. *MABUIA QUINQUETENIATA* Licht.

a, b. Hellenvale Farm, near Bulawayo.

c. Khami River, Oct. 1907.

d-g. Colleen Bawn Mine, Gwanda Dist., Dec. 1908.

h. Empandene.

Commonly found among boulders of granite kopjes.

22. *MABUIA VARIA* Peters.

a. Khami River, Oct. 1907.

b, c. Colleen Bawn Mine, Gwanda Dist., Dec. 1908.

d. Empandene.

Found only on the rocks and on granite kopjes.

23. *MABUIA STRIATA* Peters.

a-d. Bulawayo.

e, f. Rhodes' Park, Matopos, April 1908.

Usually seen on the walls of buildings, in the sun, catching flies. Very common at Bulawayo.

"Umbankwa."

24. *LYGOSOMA SUNDEVALLI* A. Smith.

a. Bulawayo, 13 Sept. 1907.

RHIPTOGLOSSA.

25. *CHAMÆLEON DILEPIS* Leach.

25 A. *CHAMÆLEON QUILENSIS* Bocage (*parvilobus* Blgr.).

Common, though not often seen on account of their assimilative coloration to the surroundings.

"Unwabu."

OPHIDIA.

26. TYPHLOPS DELALANDII D. & B.

a, b. Bulawayo, 20 Oct. 1907.

27. TYPHLOPS MUCRUSO Peters.

a, b. Bulawayo.

c, d. Matopos.

Var. VARIUS.

e-l. Bulawayo.

Both varieties are very common at Bulawayo.

"Inyorka umshlaba."

28. GLAUCONIA SCUTIFRONS Peters.

a-h. Bulawayo.

"Insunula."

29. PYTHON SEBÆ Gmel.

a. Fort Usher, Matopos.

b. Springvale Farm, 16 miles S.E. of Bulawayo.

c. Syringa.

Commonly found in the hilly country.

"Inshlatu."

30. BOODON LINEATUS D. & B.

a-m. Bulawayo.

n. Shangani River, Nov. 1907.

o. Gwamayaya River, Nov. 1907.

31. LYCOPHIDIUM CAPENSE A. Smith.

a-c. Bulawayo.

d. Metetsi.

The Bulawayo examples represent form A of the British Museum Catalogue, while the specimen from Metetsi agrees with B.

32. SIMOCEPHALUS CAPENSIS A. Smith.

a. Bulawayo, 13 Dec. 1907.

b. Filabusi.

"Inyanda izulu."

33. PSEUDASPIS CANA Linn.

a. Yg. Bulawayo, Jan. 1908.

34. CHLOROPHIS IRREGULARIS Leach.

a. Victoria Falls, 16 Sept. 1908.

35. DASYPELTSIS SCABRA Linn.

a, b. Bulawayo.